# Dell Precision™ M6400 Service Manual



Model PP08X

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# Notes, Notices, and Cautions

**NOTE:** A NOTE indicates important information that helps you make better use of your computer.

**NOTICE: A NOTICE indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.**

**CAUTION: A CAUTION indicates potential for property damage, personal injury, or death.**

If you purchased a DELL™ n Series computer, any references in this document to Microsoft® Windows® operating systems are not applicable.

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# Troubleshooting

**Dell Precision™ M6400 Service Manual**



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## Troubleshooting Tools

### Diagnostic Lights

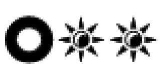
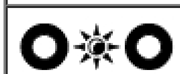
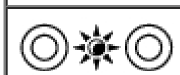
**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

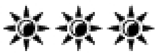
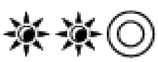
Your computer has three keyboard status lights located above the keyboard. During normal operation, the keyboard status lights display the current status (*on* or *off*) of the Num Lock, Caps Lock, and Scroll Lock features. If the computer starts without error, the lights flash, and then turn off. If the computer malfunctions, however, you can use the status of the lights to help identify the problem.

**NOTE:** After the computer completes POST, the Num Lock light may remain on, depending on your BIOS settings. For more information on using the system setup program, see the *Dell™ Technology Guide* at **support.dell.com**.

#### Diagnostic Light Codes During POST

To troubleshoot a problem with your computer, read the sequence of the keyboard status lights in order from left to right (Num Lock, Caps Lock, and then Scroll Lock). If the computer malfunctions, the individual lights display a status of either *On*  , *Off*  , or *Flashing*  .

| Light Pattern | Problem Description | Suggested Resolution |
|---|---|---|
|  | No memory modules are detected. | • If two or more memory modules are installed, remove the modules (see Removing a Memory Module), then reinstall one module (see Replacing a Memory Module) and restart the computer. If the computer starts normally, continue to install additional memory modules (one at a time) until you have identified a faulty module or reinstalled all modules without error.<br>• If available, install working memory of the same type into your computer (see Memory).<br>• If the problem persists, contact Dell Support. |
|  | Memory modules are detected, but a memory failure has occurred. | • If two or more memory modules are installed, remove the modules (see Removing a Memory Module), then reinstall one module (see Replacing a Memory Module) and restart the computer. If the computer starts normally, continue to install additional memory modules (one at a time) until you have identified a faulty module or reinstalled all modules without error.<br>• If available, install working memory of the same type into your computer (see Memory).<br>• If the problem persists, contact Dell Support. |
|  | Memory failed to initialize or | • If two or more memory modules are installed, remove the modules (see Removing a Memory Module), then reinstall one module (see Replacing a Memory Module) and |

| | | |
|---|---|---|
| | memory is unsupported. | restart the computer. If the computer starts normally, continue to install additional memory modules (one at a time) until you have identified a faulty module or reinstalled all modules without error.<br>• If available, install working memory of the same type into your computer (see Memory).<br>• If the problem persists, contact Dell Support. |
|  | System board failure has occurred. | • Contact Dell Support. |
|  | A possible processor failure has occurred. | • Reseat the processor (see Processor Module).<br>• If the problem persists, contact Dell Support. |
|  | A possible graphics card/video failure has occurred. | • Reseat any installed graphics cards.<br>• If available, install a working graphics card into your computer.<br>• If the problem persists, contact Dell Support. |
|  | A possible LCD failure has occurred. | • Reseat the LCD cable (see Edge-to-Edge Display).<br>• If the problem persists, contact Dell Support. |
|  | System failed on hard drive initialization. | • Reseat the hard drive (see Hard Drive).<br>• If the problem persists, contact Dell Support. |
|  | System failed in Option ROM initialization. | • If you have added any plug-in hardware with an option ROM, try removing or reseating it.<br>• If the problem persists, contact Dell Support. |

## Hardware Troubleshooter

If a device is either not detected during the operating system setup or is detected, but incorrectly configured, you can use the Hardware Troubleshooter to resolve the incompatibility.

*Microsoft® Windows® XP:*

1. Click **Start**® **Help and Support**.
2. Type `hardware troubleshooter` in the search field and press <Enter> to start the search.
3. In the **Fix a Problem** section, click **Hardware Troubleshooter**.
4. In the **Hardware Troubleshooter** list, select the option that best describes the problem and click **Next** to follow the remaining troubleshooting steps.

*Microsoft Windows Vista®:*

1. Click the Windows Vista start button **,** and click **Help and Support.**
2. Type `hardware troubleshooter` in the search field and press <Enter> to start the search.
3. In the search results, select the option that best describes the problem and follow the remaining troubleshooting steps.

## Dell Diagnostics

**CAUTION: Before working inside your computer, read the safety information that shipped with your**

**computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

## When to Use the Dell Diagnostics

If you experience a problem with your computer, perform the checks in Solving Problems, and then run the Dell Diagnostics before contacting Dell for assistance.

Start the Dell Diagnostics from your hard drive or from the *Drivers and Utilities* media provided with your computer.

**NOTE:** The *Drivers and Utilities* media is optional and may not ship with your computer.

**NOTE:** The Dell Diagnostics only operate on Dell computers.

## Starting the Dell Diagnostics From Your Hard Drive

Before running the Dell Diagnostics, enter system setup to review your computer's configuration information, and ensure that the device you want to test is displayed in system setup and is active. For more information on using the system setup program, see the *Dell™ Technology Guide* at **support.dell.com.**

The Dell Diagnostics is located on a separate diagnostic utility partition on your hard drive.

**NOTE:** If the computer is connected to a docking device (docked), undock it. See the documentation that came with your docking device for instructions.

**NOTE:** If your computer does not display a screen image, contact Dell Support.

1. Ensure that the computer is connected to an electrical outlet that is known to be working properly.
2. Press and hold the <Fn> key, then turn on your computer.

   **NOTE:** Alternatively, you can select **Diagnostics** from the one-time boot menu at startup.

   The computer runs the Pre-boot System Assessment (PSA), a series of initial tests of your system board, keyboard, display, memory, hard drive, etc.

   - During the assessment, answer any questions that appear.
   - If failures are detected during the Pre-boot System Assessment, write down the error code(s) and contact Dell Support.
   - If the Pre-boot System Assessment completes successfully, the following message appears: "`Booting Dell Diagnostic Utility Partition. Press any key to continue.`"

   **NOTE:** If you see a message stating that no diagnostics utility partition has been found, run the Dell Diagnostics from your *Drivers and Utilities* media (see Starting the Dell Diagnostics From the Drivers and Utilities Media).

3. Press any key to start the Dell Diagnostics from the diagnostics utility partition on your hard drive.
4. Press <Tab> to select **Test System** and then press <Enter>.

   **NOTE:** It is recommended that you select **Test System** to run a complete test on your computer. Selecting **Test Memory** initiates the extended memory test, which can take up to thirty minutes or more to complete. When the test completes, record the test results and then press any key to return to the previous menu.

5. At the Dell Diagnostics Main Menu, left-click with the touch pad/mouse, or press <Tab> and then <Enter>, to select the test you want to run (see Dell Diagnostics Main Menu).

**NOTE:** Write down any error codes and problem descriptions exactly as they appear and follow the instructions on the screen.

6. After all tests have completed, close the test window to return to the Dell Diagnostics Main Menu.
7. Close the Main Menu window to exit the Dell Diagnostics and restart the computer.

**NOTE:** If you see a message stating that no diagnostics utility partition has been found, run the Dell Diagnostics from your *Drivers and Utilities* media (see Starting the Dell Diagnostics From the Drivers and Utilities Media).

## Starting the Dell Diagnostics From the Drivers and Utilities Media

Before running the Dell Diagnostics, enter system setup to review your computer's configuration information, and ensure that the device you want to test is displayed in system setup and is active. For more information on using the system setup program, see the *Dell™ Technology Guide* at **support.dell.com.**

1. Insert the *Drivers and Utilities* media into the optical drive.
2. Restart your computer.
3. When the DELL logo appears, press <F12> immediately.

   **NOTE:** Keyboard failure may result when a key is held down for extended periods of time. To avoid possible keyboard failure, press and release <F12> in even intervals to open the Boot Device Menu.

   If you wait too long and the operating system logo appears, continue to wait until you see the Microsoft Windows desktop, then shut down your computer and try again.
4. When the boot device list appears, use the up- or down- arrow keys to highlight **CD/DVD/CD-RW Drive** then press <Enter>.

   **NOTE:** Using the one-time boot menu changes the boot sequence for the current boot only. Upon restart, the computer boots according to the boot sequence specified in system setup.
5. Press any key to confirm that you want to start from the CD/DVD.

   If you wait too long and the operating system logo appears, continue to wait until you see the Microsoft Windows desktop, then shut down your computer and try again.
6. Type 1 to **Run the 32 Bit Dell Diagnostics**.
7. At the **Dell Diagnostics Menu**, type 1 to select **Dell 32-bit Diagnostics for Resource CD (graphical user interface)**.
8. Press <Tab> to select **Test System** and then press <Enter>.

   **NOTE:** It is recommended that you select **Test System** to run a complete test on your computer. Selecting **Test Memory** initiates the extended memory test, which can take up to thirty minutes or more to complete. When the test completes, record the test results and then press any key to return to the previous menu.
9. At the Dell Diagnostics Main Menu, left-click with the mouse, or press <Tab> and then <Enter>, to select the test you want to run (see Dell Diagnostics Main Menu).

   **NOTE:** Write down any error codes and problem descriptions exactly as they appear and follow the instructions on the screen.
10. After all tests have completed, close the test window to return to the Dell Diagnostics Main Menu.
11. Close the Main Menu window to exit the Dell Diagnostics and restart the computer.

12. Remove the *Drivers and Utilities* media from the optical drive.

## Dell Diagnostics Main Menu

After the Dell Diagnostics loads, the following menu appears:

| Option | Function |
|---|---|
| Test Memory | Run the stand-alone memory test |
| Test System | Run system diagnostics |
| Exit | Exit the diagnostics |

Press <Tab> to select the test you want to run and then press <Enter>.

**NOTE:** It is recommended that you select **Test System** to run a complete test on your computer. Selecting **Test Memory** initiates the extended memory test, which can take up to thirty minutes or more to complete. When the test completes, record the test results and then press any key to return to this menu.

After **Test System** is selected, the following menu appears:

| Option | Function |
|---|---|
| Express Test | Performs a quick test of devices in the system. This typically can take 10 to 20 minutes.<br><br>**NOTE:** The Express Test requires no interaction on your part. Run Express Test first to increase the possibility of tracing a problem quickly. |
| Extended Test | Performs a thorough check of devices in the system. This typically can take an hour or more.<br><br>**NOTE:** The Extended Test periodically requires your input to answer specific questions. |
| Custom Test | Use to test a specific device or customize the tests to be run. |
| Symptom Tree | This option allows you to select tests based on a symptom of the problem you are having. This option lists the most common symptoms. |

**NOTE:** It is recommended that you select **Extended Test** to perform a more thorough check of devices in the computer.

For any problem encountered during a test, a message appears with an error code and a description of the problem. Write down the error code and problem description exactly as it appears and follow the instructions on the screen. If you cannot resolve the problem, contact Dell Support.

**NOTE:** When contacting Dell Support, have your Service Tag ready. The Service Tag for your computer is located at the top of each test screen.

The following tabs provide additional information for tests run from the Custom Test or Symptom Tree option:

| Tab | Function |
|---|---|
| Results | Displays the results of the test and any error conditions encountered. |
| Errors | Displays error conditions encountered, error codes, and the problem description. |
| Help | Describes the test and any requirements for running the test. |
| Configuration | Displays the hardware configuration for the selected device. |

| | |
|---|---|
| | The Dell Diagnostics obtains configuration information for all devices from System Setup, memory, and various internal tests, and displays the information in the device list in the left pane of the screen.<br><br>**NOTE:** The device list may not display the names of all components installed on your computer or all devices attached to your computer. |
| Parameters | Allows you to customize the test, if applicable, by changing the test settings. |

## Error Messages

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

If the error message is not listed, see the documentation for the operating system or the program that was running when the message appeared.

**A filename cannot contain any of the following characters: \ / : * ? " < > | —** Do not use these characters in filenames.

**A required .DLL file was not found —** The program that you are trying to open is missing an essential file. To remove and then reinstall the program:

*Windows XP*:

1. Click **Start**® **Control Panel**® **Add or Remove Programs**® **Programs and Features**.
2. Select the program you want to remove.
3. Click **Uninstall**.
4. See the program documentation for installation instructions.

*Windows Vista*:

1. Click **Start** ® **Control Panel**® **Programs**® **Programs and Features**.
2. Select the program you want to remove.
3. Click **Uninstall**.
4. See the program documentation for installation instructions.

***drive letter* :\ is not accessible. The device is not ready —** The drive cannot read the disk. Insert a disk into the drive and try again.

**Insert bootable media —** Insert a bootable floppy disk, CD, or DVD.

**Non-system disk error —** Remove the floppy disk from the floppy drive and restart your computer.

**Not enough memory or resources. Close some programs and try again —** Close all windows and open the program that you want to use. In some cases, you may have to restart your computer to restore computer resources. If so, run the program that you want to use first.

**Operating system not found —** Contact Dell Support.

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## Solving Problems

Follow these tips when troubleshooting your computer:

- If you added or removed a part before the problem started, review the installation procedures and ensure that the part is correctly installed.

- If a peripheral device does not work, ensure that the device is properly connected.
- If an error message appears on the screen, write down the exact message. This message may help support personnel diagnose and fix the problem(s).
- If an error message occurs in a program, see the program's documentation.

**NOTE:** The procedures in this document were written for the Windows default view, so they may not apply if you set your Dell computer to the Windows Classic view.

## Battery Problems

**CAUTION: There is a danger of a new battery exploding if it is incorrectly installed. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.**

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## Drive Problems

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**Ensure that Microsoft Windows Recognizes the drive —**

*Windows XP*:

- Click **Start and click My Computer**.

*Windows Vista*:

- Click the Windows Vista Start button and click **Computer**.

If the drive is not listed, perform a full scan with your antivirus software to check for and remove viruses. Viruses can sometimes prevent Windows from recognizing the drive.

**Test the drive —**

- Insert another disc to eliminate the possibility that the original drive is defective.
- Insert a bootable floppy disk and restart the computer.

**Clean the drive or disk —**

For information on cleaning your computer, see the *Dell™ Technology Guide* at **support.dell.com**.

**Check the cable connections**

**Run the Hardware Troubleshooter —**

See Hardware Troubleshooter.

**Run the Dell Diagnostics —**

See Dell Diagnostics.

## Optical drive problems

**NOTE:** High-speed optical drive vibration is normal and may cause noise, which does not indicate a defect in the drive or the media.

**NOTE:** Because of different regions worldwide and different disc formats, not all DVD titles work in all DVD drives.

### Adjust the Windows volume control —

- Click the speaker icon in the lower-right corner of your screen.
- Ensure that the volume is turned up by clicking the slidebar and dragging it up.
- Ensure that the sound is not muted by clicking any boxes that are checked.

### Check the speakers and subwoofer —

See Sound and Speaker Problems.

## Problems writing to an optical drive

### Close other programs —

The optical drive must receive a steady stream of data during the writing process. If the stream is interrupted, an error occurs. Try closing all programs before you write to the optical.

### Turn off standby mode in Windows before writing to a disc —

For information about setting power options, see the *Dell™ Technology Guide* at **support.dell.com**. You can also search for the keyword *standby* in Windows Help and Support for information on power management modes.

## Hard drive problems

### Run Check Disk —

*Windows XP*:

1. Click **Start and click My Computer**.
2. Right-click **Local Disk C:**.
3. Click **Properties® Tools® Check Now**.
4. Click **Scan for and attempt recovery of bad sectors and click Start**.

*Windows Vista*:

1. Click **Start** and click **Computer**.
2. Right-click **Local Disk C:**.
3. Click **Properties® Tools® Check Now**.

   The **User Account Control** window may appear. If you are an administrator on the computer, click **Continue**; otherwise, contact your administrator to continue the desired action.

4. Follow the instructions on the screen.

# IEEE 1394 Device Problems

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**NOTE:** Your computer supports only IEEE 1394a standard.

**Ensure that the cable for the IEEE 1394 device is properly inserted into the device and into the connector on the computer**

**Ensure that the IEEE 1394 device is enabled in system setup —** For more information on using the system setup program, see the *Dell™ Technology Guide* at **support.dell.com.**

**Ensure that the IEEE 1394 device is recognized by Windows —**

*Windows XP*:

1. Click **Start and click Control Panel**.
2. Under **Pick a Category**, click **Performance and Maintenance**® **System**® **System Properties** ® **Hardware**® **Device Manager**.

*Windows Vista*:

1. Click **Start** ® **Control Panel**® **Hardware and Sound**.
2. Click **Device Manager.**

If your IEEE 1394 device is listed, Windows recognizes the device.

**If you have problems with a Dell IEEE 1394 device —**

Contact Dell Support.

**If you have problems with an IEEE 1394 device not provided by Dell —** Contact the IEEE 1394 device manufacturer.

# Lockups and Software Problems

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

## The computer does not start up

**Check the diagnostic lights —**

See Power Problems.

**Ensure that the power cable is firmly connected to the computer and to the electrical outlet**

## The computer stops responding

**NOTICE: You may lose data if you are unable to perform an operating system shutdown.**

**Turn the computer off —** If you are unable to get a response by pressing a key on your keyboard or moving your mouse, press and hold the power button for at least 8 to 10 seconds (until the computer turns off), and then restart your computer.

## A program stops responding

**End the program —**

1. Press <Ctrl><Shift><Esc> simultaneously to access the Task Manager.
2. Click the **Applications** tab.
3. Click to select the program that is no longer responding.
4. Click **End Task**.

## A program crashes repeatedly

**NOTE:** Most software includes installation instructions in its documentation or on a floppy disk, CD, or DVD.

### Check the software documentation —

If necessary, uninstall and then reinstall the program.

## A program is designed for an earlier Windows operating system

### Run the Program Compatibility Wizard —

*Windows XP*:

The Program Compatibility Wizard configures a program so that it runs in an environment similar to non-XP operating system environments.

1. Click **Start**® **All Programs**® **Accessories**® **Program Compatibility Wizard**® **Next**.
2. Follow the instructions on the screen.

*Windows Vista*:

The Program Compatibility Wizard configures a program so that it runs in an environment similar to non-Windows Vista operating system environments.

1. Click **Start** ® **Control Panel**® **Programs**® **Use an older program with this version of Windows.**
2. In the welcome screen, click **Next**.
3. Follow the instructions on the screen.

## A solid blue screen appears

### Turn the computer off —

If you are unable to get a response by pressing a key on your keyboard or moving your mouse, press and hold the power button for at least 8 to 10 seconds (until the computer turns off), and then restart your computer.

## Other software problems

### Check the software documentation or contact the software manufacturer for troubleshooting information —

- Ensure that the program is compatible with the operating system installed on your computer.
- Ensure that your computer meets the minimum hardware requirements needed to run the software. See the software documentation for information.
- Ensure that the program is installed and configured properly.
- Verify that the device drivers do not conflict with the program.
- If necessary, uninstall and then reinstall the program.

**Back up your files immediately**

**Use a virus-scanning program to check the hard drive, floppy disks, CDs, or DVDs**

**Save and close any open files or programs and shut down your computer through the Start menu**

# Memory Problems

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**If you receive an insufficient memory message —**

- Save and close any open files and exit any open programs you are not using to see if that resolves the problem.
- See the software documentation for minimum memory requirements. If necessary, install additional memory (see Replacing a Memory Module).
- Reseat the memory modules (see Memory) to ensure that your computer is successfully communicating with the memory.
- Run the Dell Diagnostics (see Dell Diagnostics).

**If you experience other memory problems —**

- Reseat the memory modules (see Memory) to ensure that your computer is successfully communicating with the memory.
- Ensure that you are following the memory installation guidelines (see Replacing a Memory Module).
- Ensure that the memory you are using is supported by your computer. For more information about the type of memory supported by your computer, see the *Setup and Quick Reference Guide* for your computer at **support.dell.com**.
- Run the Dell Diagnostics (see Dell Diagnostics).

# Power Problems

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**If the power light is blue and the computer is not responding —** See Diagnostic Lights.

**If the power light is off —** The computer is either turned off or is not receiving power.

- Reseat the power cable in the power connector on the back of the computer and the electrical outlet.
- Bypass power strips, power extension cables, and other power protection devices to verify that the computer turns on properly.
- Ensure that any power strips being used are plugged into an electrical outlet and are turned on.
- Ensure that the electrical outlet is working by testing it with another device, such as a lamp.

**Eliminate interference —** Some possible causes of interference are:

- Power, keyboard, and mouse extension cables
- Too many devices connected to the same power strip
- Multiple power strips connected to the same electrical outlet

# Sound and Speaker Problems

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

### No sound from speakers

**NOTE:** The volume control in MP3 and other media players may override the Windows volume setting. Always check to ensure that the volume on the media player(s) has not been turned down or off.

**Adjust the Windows volume control —** Click or double-click the speaker icon in the lower-right corner of your screen. Ensure that the volume is turned up and that the sound is not muted.

**Disconnect headphones from the headphone connector —** Sound from the speakers is automatically disabled when headphones are connected to the computer's front-panel headphone connector.

**Eliminate possible interference —** Turn off nearby fans, fluorescent lights, or halogen lamps to check for interference.

**Run the Hardware Troubleshooter —** See Hardware Troubleshooter.

### No sound from headphones

**Check the headphone cable connection —** Ensure that the headphone cable is securely inserted into the headphone connector. See the *Setup and Quick Reference Guide* for your computer at **support.dell.com**.

**Adjust the Windows volume control —** Click or double-click the speaker icon in the lower-right corner of your screen. Ensure that the volume is turned up and that the sound is not muted.

## Video and Display Problems

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**NOTICE: If your computer came with a PCI graphics card installed, removal of the card is not necessary when installing additional graphics cards; however, the card is required for troubleshooting purposes. If you remove the card, store it in a safe and secure location. For information about your graphics card, go to support.dell.com.**

**Check the diagnostic lights —**

See Diagnostic Lights.

**Check the display settings —**

See the *Dell™ Technology Guide* at **support.dell.com**.

**Adjust the Windows display settings —**

*Windows XP:*

1. Click **Start**® **Control Panel**® **Appearance and Themes**.
2. Click the area you want to change or click the **Display** icon.
3. Try different settings for **Color quality** and **Screen resolution**.

*Windows Vista*:

1. Click **Start** ® **Control Panel**® **Hardware and Sound**® **Personalization**® **Display Settings**.
2. Adjust **Resolution** and **Colors settings,** as needed.

### Only part of the display is readable

**Connect an external monitor —**

1. Shut down your computer and connect an external monitor to the computer.
2. Turn on the computer and the monitor and adjust the monitor brightness and contrast controls.

If the external monitor works, the computer display or video controller may be defective. Contact Dell Support.

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# Dell Technical Update Service

The Dell Technical Update service provides proactive e-mail notification of software and hardware updates for your computer. The service is free and can be customized for content, format, and how frequently you receive notifications.

To enroll for the Dell Technical Update service, go to **support.dell.com**.

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# Working on Your Computer

**Dell Precision™ M6400 Service Manual**



This document provides procedures for removing and installing the components in your computer. Unless otherwise noted, each procedure assumes that:

- You have performed the steps in Before Working on Your Computer.
- You have read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.

**NOTE:** The color of your computer and certain computer components may appear differently than shown in this document.

## Recommended Tools

The procedures in this document may require the following tools:

- Small flat-blade screwdriver
- Phillips screwdriver
- Small plastic scribe
- Flash BIOS update (see the Dell Support website at **support.dell.com**)

## Before Working on Your Computer

Use the following safety guidelines to help protect your computer from potential damage and to help ensure your own personal safety.

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**CAUTION: Many repairs may only be done by a certified service technician. You should only perform troubleshooting and simple repairs as authorized in your product documentation, or as directed by the online or telephone service and support team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. Read and follow the safety instructions that came with the product.**

**NOTICE: To avoid electrostatic discharge, ground yourself by using a wrist grounding strap or by periodically touching an unpainted metal surface, such as a connector on the back of the computer.**

**NOTICE: Handle components and cards with care. Do not touch the components or contacts on a card. Hold a card by its edges or by its metal mounting bracket. Hold a component such as a processor by its edges, not by its pins.**

**NOTICE: When disconnecting a cable, pull on the cable's connector or on its strain-relief loop, not on the cable itself. For cable connectors with locking tabs, press inward on the locking tabs to release the connector. When connecting a cable, ensure that the connectors are correctly oriented and aligned to avoid damage to the connector and/or the connector's pins.**

1. Ensure that the work surface is flat and clean to prevent the computer cover from being scratched.
2. Shut down your computer.
   - In Windows XP, click **Start**® **Shutdown**® **Shutdown**.
   - In Windows Vista, click **Start** , click the arrow icon, and then click **Shut Down** to turn off your computer.

**NOTE:** Ensure that the computer is off and not in a power management mode. If you cannot shut down the computer using the operating system, press and hold the power button for 4 seconds.

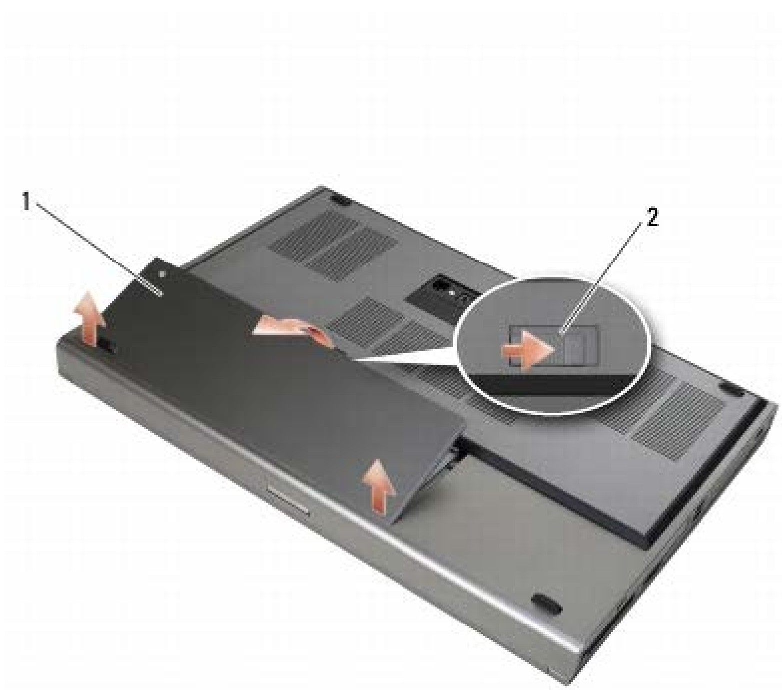
3. Disconnect your computer and all attached devices from their electrical outlets.

**NOTICE: To disconnect a network cable, first unplug the cable from your computer, and then unplug it from the network wall jack.**

4. Disconnect any telephone or network cables from the computer.

**NOTICE: To help prevent damage to the system board, you must remove the battery from the battery bay before you service the computer.**

5. Turn the computer upside down.
6. Slide the battery release latch and remove the battery.




| | | | |
|---|---|---|---|
| 1 | battery | 2 | battery release latch |

7. Disconnect any external devices and remove any cards before working on your computer:
   - To remove a card, such as an ExpressCard, see the *Dell™ Technology Guide* at **support.dell.com**.
   - To undock from a docking device, see the *E-Port User's Guide* or the *E-Port Plus User's Guide at* ***support.dell.com***.

8. Turn the computer topside up, open the display, and press the power button to ground the system board.

---

# After Working on Your Computer

After you have completed the replacement procedures, ensure you connect the external devices, cards, and cables before turning on your computer.

**NOTE:** To avoid damage to the computer, use only the battery designed for this particular Dell computer. Do not use batteries designed for other Dell computers.

1. Connect external devices, replace cards, and connect telephone or network cables to your computer.
2. Slide the battery into the battery bay and snap it into place.
3. Connect your computer and attached devices to their electrical outlets.
4. Turn on your computer.

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# Base Assembly

**Dell Precision™ M6400 Service Manual**

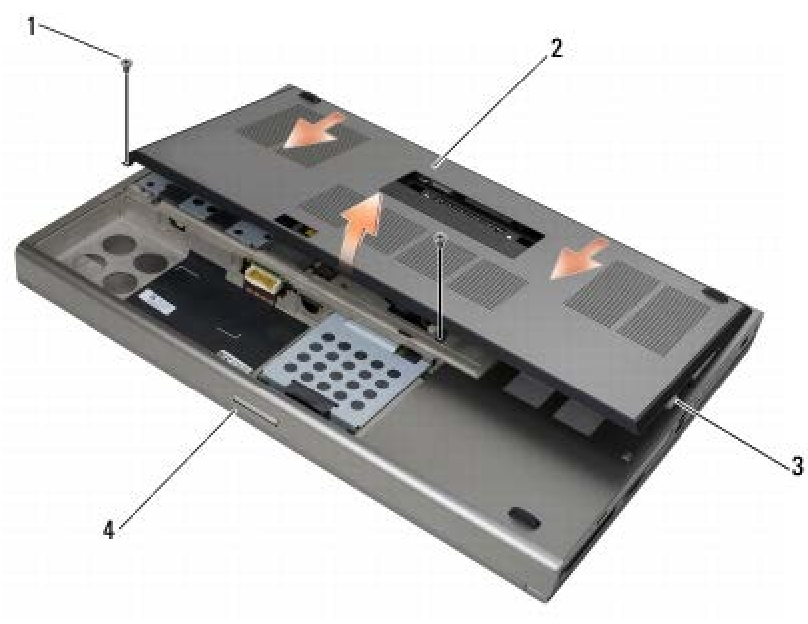


**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

---

## Removing the Base Assembly Cover

1. Follow the procedures in Before Working on Your Computer.
2. Close the display and turn the computer upside down.
3. Remove the two M2 x 3-mm screws.
4. Slide the cover toward the front of the computer to release the tabs from the base assembly.
5. Remove the cover from the base assembly.




| | | | |
|---|---|---|---|
| 1 | M2 x 3-mm screws (2) | 2 | cover |
| 3 | bottom tabs (10) | 4 | front of the computer |

---

## Replacing the Base Assembly Cover

1. Align the tabs with the slots on the base assembly.
2. Slide the cover toward the back of the computer to engage the tabs and firmly attach the cover to the base assembly.

3. Replace the M2 x 3-mm screws.

4. Follow the procedures in After Working on Your Computer.

---

# Removing the Base Assembly

1. Follow the procedures in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Remove the primary hard drive (see Removing the Primary Hard Drive (HDD1)) and the secondary hard drive (see Removing the Secondary Hard Drive (HDD2)).
4. Remove the optical drive (see Removing the Optical Drive).
5. Remove the LED cover (see Removing the LED Cover).
6. Remove the keyboard (see Removing the Keyboard).
7. Remove the display assembly (see Removing the Edge-to-Edge Display or Removing the Display Assembly).
8. Remove the palm rest (see Removing the Palm Rest Assembly).
9. Remove the fan (see Removing the Fan).
10. Remove the processor heatsink assembly (see Removing the Processor Heatsink Assembly).
11. Remove the video card/heatsink assembly (see Removing the Video Card/Heatsink Assembly).
12. Remove the card cage (see Removing the Card Cage).
13. Remove the left I/O board (see Removing the Left I/O Board).
14. Remove the right I/O board (see Removing the Right I/O Board).
15. Remove the system board (see Removing the System Board).

---

# Replacing the Base Assembly

1. Replace the system board (see Replacing the System Board).
2. Replace the right I/O board (see Replacing the Right I/O Board).
3. Replace the left I/O board (see Replacing the Left I/O Board).
4. Replace the card cage (see Replacing the Card Cage).
5. Replace the video card/heatsink assembly (see Replacing the Video Card/Heatsink Assembly).
6. Replace the processor heatsink assembly (see Replacing the Processor Heatsink Assembly).
7. Replace the fan (see Replacing the Fan).
8. Replace the palm rest (see Replacing the Palm Rest Assembly).
9. Replace the display assembly (see Replacing the Edge-to-Edge Display or Replacing the Display Assembly).
10. Replace the keyboard (see Replacing the Keyboard).
11. Replace the LED cover (see Replacing the LED Cover).

12. Replace the optical drive (see Replacing the Optical Drive).

13. Replace the primary hard drive (see Replacing the Primary Hard Drive (HDD1)) and the secondary hard drive (see Replacing the Secondary Hard Drive (HDD2)).

14. Replace the base assembly cover (see Replacing the Base Assembly Cover).

15. Follow the procedures in After Working on Your Computer.

**NOTE:** If you use a BIOS update program disc to flash the BIOS, press <F12> before inserting the disc in order to set the computer to boot from the disc for one time only. Otherwise, you must enter the system setup program to change the default boot order.

16. Flash update the BIOS (see Flashing the BIOS for more information).

17. Enter the system setup program to update the BIOS on the new system board with the computer Service Tag. For information on the system setup program, see the *Dell™ Technology Guide* at **support.dell.com**.

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# Hard Drive

**Dell Precision™ M6400 Service Manual**



**NOTE:** Dell does not guarantee compatibility or provide support for hard drives obtained from sources other than Dell.

## Removing the Primary Hard Drive (HDD1)

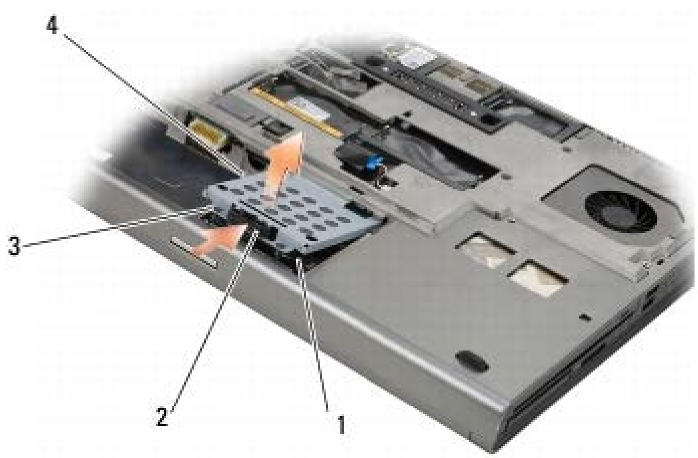
**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**CAUTION: Do not touch the metal housing of the hard drive if you remove the hard drive from the computer while the drive is hot.**

**NOTICE: To prevent data loss, turn off your computer before removing the hard drive. Do not remove the hard drive while the computer is on or in Sleep state.**

**NOTICE: Hard drives are extremely fragile. Exercise care when handling the hard drive.**

1. Follow the procedures in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Loosen the two captive screws on the HDD1 carrier, and remove the carrier.
4. Push in, then pull up on the safety loop to remove the cover.



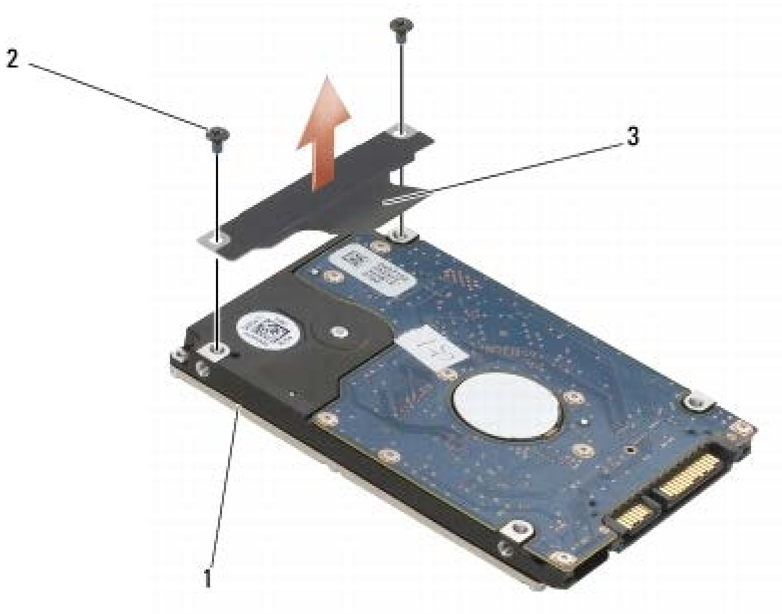

| | | | |
|---|---|---|---|
| 1 | HDD1 | 2 | safety loop |
| 3 | captive screws (2) | 4 | carrier |

5. Use the pull tab to disconnect the HDD1 from the connector on the system board, and remove the HDD1 from the computer.




| | | | |
|---|---|---|---|
| 1 | HDD1 | 2 | pull tab |

6. Remove the two M3 x 3-mm screws that secure the pull tab to the HDD1.
7. Set the pull tab aside to use with the replacement HDD1.




| | | | |
|---|---|---|---|
| 1 | HDD1 | 2 | M3 x 3-mm screws (2) |
| 3 | pull tab | | |

---

# Replacing the Primary Hard Drive (HDD1)

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**NOTICE: Hard drives are extremely fragile. Exercise care when handling the hard drive.**

**NOTICE: Use firm and even pressure to slide the hard drive into place. Excessive force may result in damage to the connector.**

1. Attach the pull tab you removed in step 7 of the removal procedure to the new HDD1.

2. Place the HDD1 in the computer, and slide the HDD1 into the connector on the system board.
3. Replace the cover on the HDD1 and tighten the two captive screws.
4. Replace the base assembly cover (see Replacing the Base Assembly Cover).
5. Follow the procedures in After Working on Your Computer.
6. Install the operating system, drivers, and utilities for your computer, as needed. For more information, see the *Setup and Quick Reference Guide* that shipped with your computer or at **support.dell.com**.

---

# Removing the Secondary Hard Drive (HDD2)

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

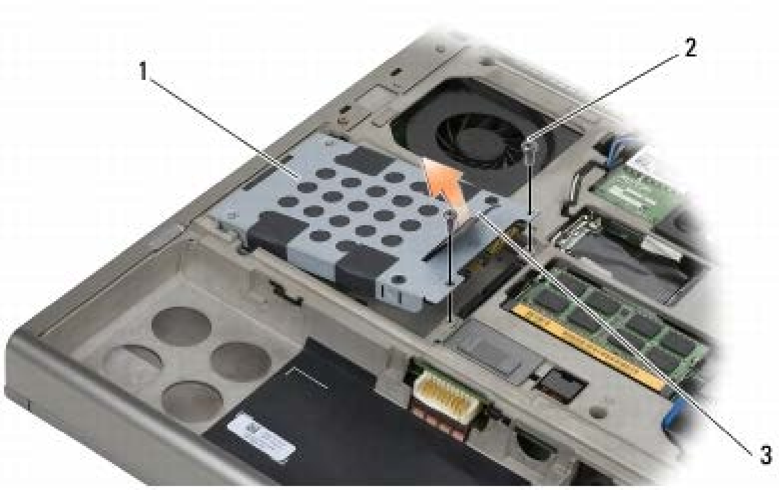
**CAUTION: Do not touch the metal housing of the hard drive if you remove the hard drive from the computer while the drive is hot.**

**NOTICE: To prevent data loss, turn off your computer before removing the hard drive. Do not remove the hard drive while the computer is on or in Sleep state.**

**NOTICE: Hard drives are extremely fragile. Exercise care when handling the hard drive.**

**NOTE:** The secondary hard drive is optional. If you did not order a secondary hard drive, the carrier will contain an interposer board.

1. Follow the procedures in Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Remove the two M3 x 3-mm screws that secure the carrier to the computer.
4. Pull up on the pull tab to remove the carrier.




| | | | |
|---|---|---|---|
| 1 | carrier | 2 | M3 x 3-mm screws (2) |
| 3 | pull tab | | |

5. Remove the two M3 x 3-mm screws that secure the carrier to the HDD2.
6. Remove the carrier from the HDD2. If your computer does not have an HDD2, remove the hard drive place-holder from the carrier.

7. Remove the interposer from the HDD2 or the place-holder, and set the interposer aside.

---

# Replacing the Secondary Hard Drive (HDD2)

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**NOTICE: Hard drives are extremely fragile. Exercise care when handling the hard drive.**

**NOTICE: Use firm and even pressure to slide the hard drive into place. Excessive force may result in damage to the connector.**

1. Connect the interposer you removed in step 7 of the removal procedure to the new HDD2.
2. Snap the carrier onto the HDD2 ensuring the two fit securely together.
3. Replace the two M3 x 3-mm screws that secure the HDD2 to the carrier.
4. Slide the posts on the carrier into the slots on the base assembly, then lower the HDD2 into place.
5. Replace the two M3 x 3-mm screws that secure the HDD2 to the computer.
6. Replace the base assembly cover (see Replacing the Base Assembly Cover).
7. Follow the procedures in After Working on Your Computer.
8. Install the operating system, drivers, and utilities for your computer, as needed. For more information, see the *Setup and Quick Reference Guide* that shipped with your computer at ***support.dell.com***.

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# Optical Drive

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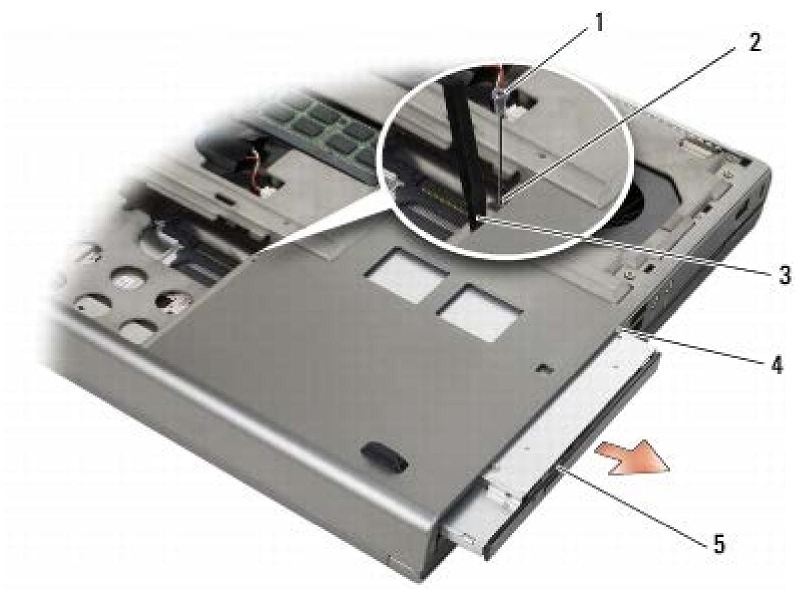


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## Removing the Optical Drive

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the procedures in Before Working on Your Computer.
2. Turn your computer upside down.
3. Remove the M2.5 x 8-mm screw in the battery bay.
4. Use the notch by the screw to push the optical drive out enough to pull it out from the bay.




| | | | |
|---|---|---|---|
| 1 | M2.5 x 8-mm screw | 2 | notch by screw |
| 3 | plastic scribe | 4 | media bay |
| 5 | optical drive | | |

---

## Replacing the Optical Drive

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**NOTE:** The security screw on the optical drive is optional and may not be installed on your computer.

1. Slide the optical drive into the media bay.
2. Replace the M2.5 x 8-mm screw.
3. Follow the procedures in After Working on Your Computer.

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# WLAN / WiMax Card

**Dell Precision™ M6400 Service Manual**



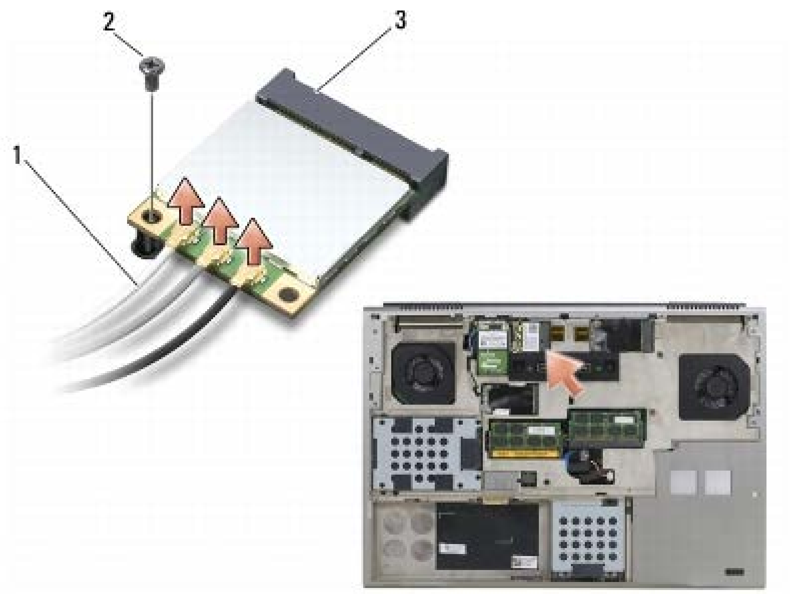
**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**NOTICE: Insert a WLAN or WiMax card only into the slot labeled WLAN/WiMax.**

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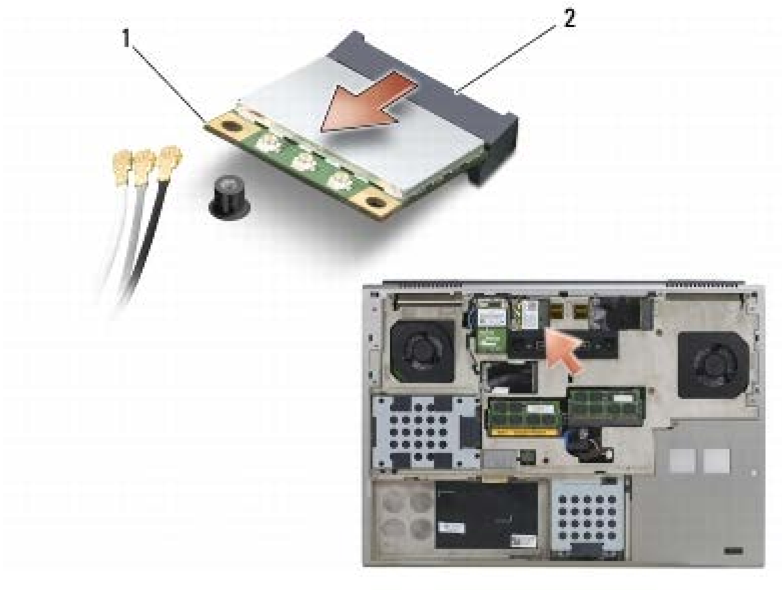
## Removing the WLAN / WiMax Card

1. Follow the procedures in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Disconnect the antenna cables from the card.
4. Remove the M2 x 3-mm screw. The card will pop up at a 45-degree angle.




| | | | |
|---|---|---|---|
| 1 | antenna cables (3) | 2 | M2 x 3-mm screw |
| 3 | WLAN/WiMax card | | |

5. Slide the card out of the card connector on the system board.




| | | | |
|---|---|---|---|
| 1 | WLAN/WiMax card | 2 | card connector |

---

# Replacing the WLAN/WiMax Card

**NOTICE: The connectors are keyed to ensure correct insertion. If you feel resistance, check the connectors on the card and on the system board, and realign the card.**

**NOTICE: To avoid damage to the WLAN or WiMax card, ensure the cables are not under the card when you replace it.**

**NOTICE: Insert a WLAN or WiMax card only into the slot labeled WLAN/WiMax.**

1. Slide the card into the connector labeled WLAN/WiMax.
2. Press the card down and hold it in place.
3. Replace the M2 x 3-mm screw.
4. Connect the appropriate antenna cables to the card that you are installing:

   If the card has two triangles on the label (white and black), connect the white antenna cable to the connector labeled "main" (white triangle), and connect the black antenna cable to the connector labeled "aux" (black triangle). Secure the gray antenna cable in the plastic holder next to the card.

   If the card has three triangles on the label (white, black, and gray), connect the white antenna cable to the white triangle, connect the black antenna cable to the black triangle, and connect the gray antenna cable to the gray triangle.

5. Replace the base assembly cover (see Replacing the Base Assembly Cover).
6. Follow the procedures in After Working on Your Computer.

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# WWAN Card

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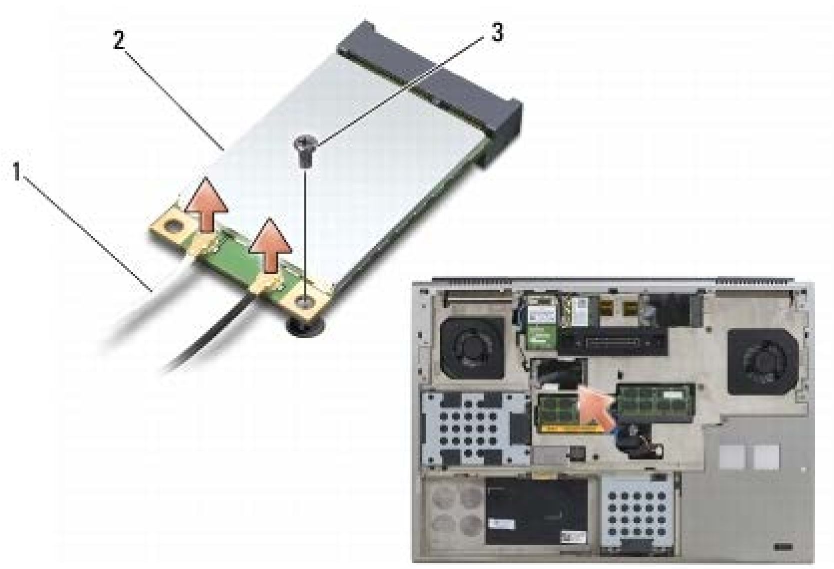
**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**NOTICE: Insert a WWAN card or FCM only into the slot labeled WWAN/FCM.**

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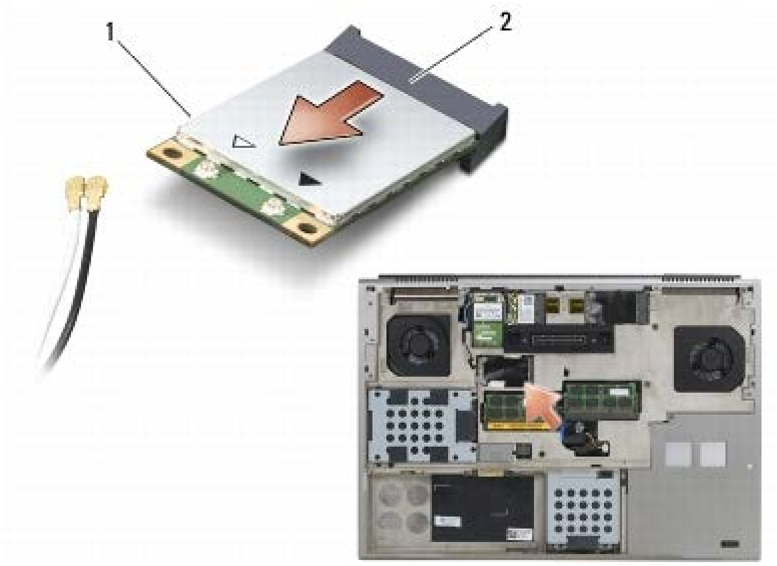
## Removing a WWAN Card

1. Follow the procedures in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Disconnect the antenna cables from the card.
4. Remove the M2 x 3-mm screw. The card pops up at a 45-degree angle.




| | | | |
|---|---|---|---|
| 1 | antenna cables (2) | 2 | WWAN card |
| 3 | M2 x 3-mm screw | | |

5. Slide the card out of the card connector on the system board.




| | | | |
|---|---|---|---|
| 1 | WWAN card | 2 | card connector |

# Replacing a WWAN Card

**NOTICE: The connectors are keyed to ensure correct insertion. If you feel resistance, check the connectors on the card and on the system board, and realign the card.**

**NOTICE: To avoid damage to the WWAN card, ensure the cables are not under the card when you replace it.**

**NOTICE: Insert a WWAN card or FCM only into the slot labeled WWAN/FCM.**

1. Slide the card into the connector labeled WWAN/FCM.
2. Press the card down and hold it in place.
3. Replace the M2 x 3-mm screw.
4. Connect the white antenna cable to the connector labeled "main" (white triangle), and connect the black antenna cable to the connector labeled "aux" (black triangle).
5. Replace the base assembly cover (see Replacing the Base Assembly Cover).
6. Follow the procedures in After Working on Your Computer.

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# UWB WPAN Card and WPAN Card With Bluetooth®Wireless Technology

**Dell Precision™ M6400 Service Manual**



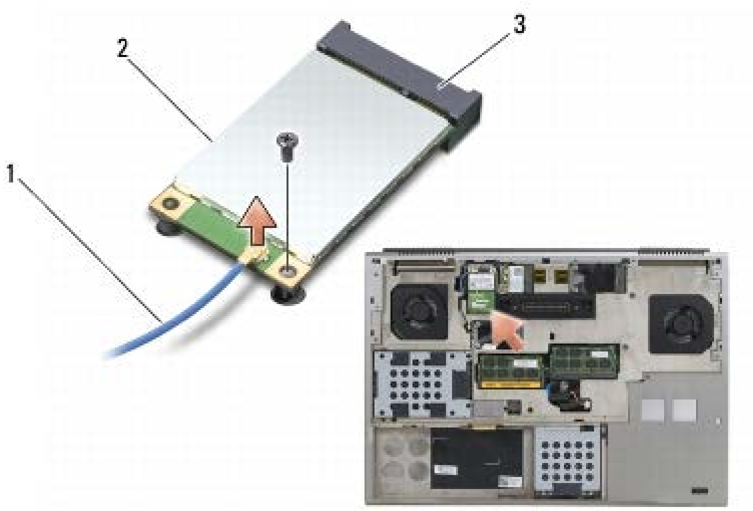
**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**NOTICE: WPAN is a generic name for Ultra Wide Band (UWB) and Bluetooth® wireless technology. Insert a WPAN card only into the slot labeled WPAN/UWB/FCM.**

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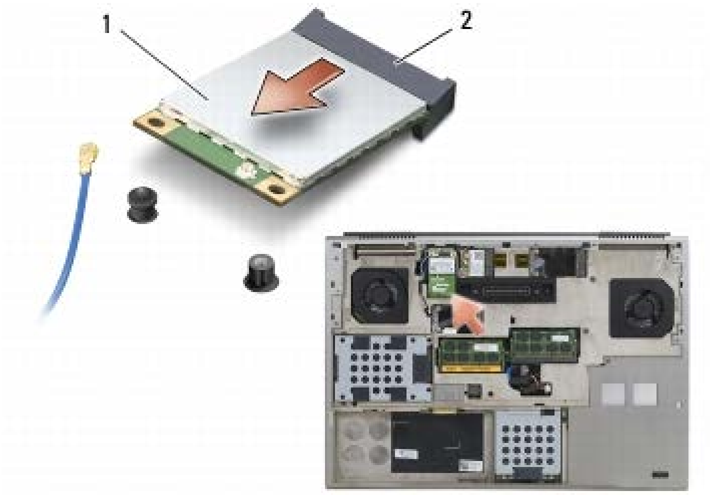
## Removing a WPAN Card

1. Follow the procedures in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Disconnect the blue antenna cable from the card.
4. Remove the M2 x 3-mm screw. The card pops up at a 45-degree angle.




| | | | |
|---|---|---|---|
| 1 | antenna cable | 2 | WPAN card |
| 3 | M2 x 3-mm screw | | |

5. Slide the card out of the card connector on the system board.




| | | | |
|---|---|---|---|
| 1 | WPAN card | 2 | card connector |

# Replacing a WPAN Card

**NOTICE: The connectors are keyed to ensure correct insertion. If you feel resistance, check the connectors on the card and on the system board, and realign the card.**

**NOTICE: To avoid damage to the WPAN card, ensure the cables are not under the card when you replace it.**

**NOTICE: Insert a WPAN card only into the slot labeled WPAN/UWB/FCM.**

1. Slide the card into the connector labeled WPAN/UWB/FCM.
2. Press the card down and hold it in place.
3. Replace the M2 x 3-mm screw.
4. Connect the blue antenna cable to the WPAN card.
5. Replace the base assembly cover (see Replacing the Base Assembly Cover).
6. Follow the procedures in After Working on Your Computer.

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# Memory

**Dell Precision™ M6400 Service Manual**



Your computer has four user-accessible SODIMM sockets: DIMM A and DIMM B are located under the keyboard; DIMM C and DIMM D are located under the base assembly cover.

**NOTICE: There are no memory size limitations between DIMM A and DIMM B; you can mix and match DDR3 module sizes between these two sockets. However, if you add memory to the DIMM C or DIMM D socket, special configuration requirements are needed. If DIMM A and DIMM D do not match, or if DIMM B and DIMM C do not match, your computer will not boot and will not generate an error message.**

You can increase your computer memory by installing memory modules on the system board. If you incorrectly replace or install a memory module in your computer, it will not boot. There are no memory size limitations between the DIMM A and DIMM B sockets. However, if you add memory to the DIMM C or DIMM D socket, special configuration requirements are needed:

- If you add memory to the DIMM C socket, the memory size must match the memory size in the DIMM B socket.
- If you add memory to the DIMM D socket, the memory size must match the memory size in the DIMM A socket.

For example, if you increase DIMM D to 4 GB, you must also increase
DIMM A to 4 GB. Note that the DIMM A socket must always be populated.

See "Specifications" in your *Setup and Quick Reference Guide* for information on the memory supported by your computer. Install only memory modules that are intended for your computer.

**NOTE:** Memory modules purchased from Dell are covered under your computer warranty.

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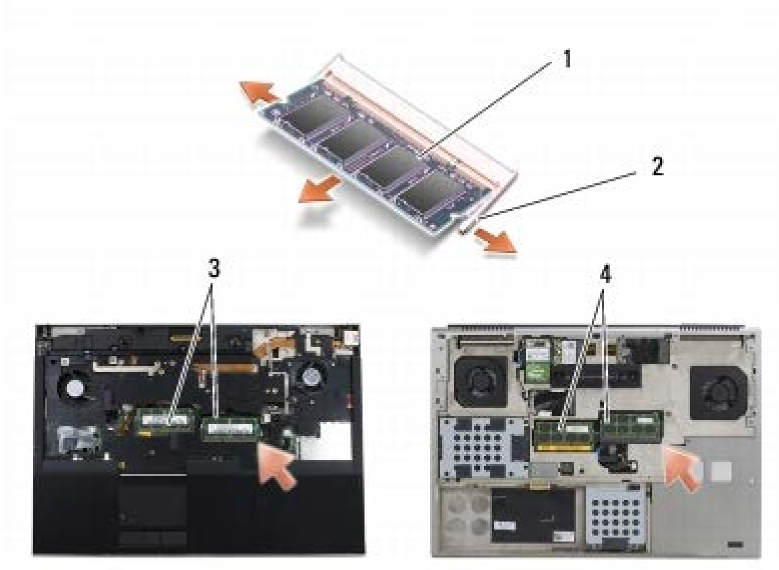
## Removing a Memory Module

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the procedures in Before Working on Your Computer.
2. To remove DIMM A or DIMM B:
   a. Remove the LED cover (see Removing the LED Cover).
   b. Remove the keyboard (see Removing the Keyboard).
3. To remove DIMM C or DIMM D:
   a. Remove the base assembly cover (see Removing the Base Assembly Cover).

**NOTICE: To prevent damage to the memory module connector, do not use tools to spread the memory module securing clips.**

4. Use your fingertips to carefully spread apart the securing clips on each end of the memory module connector until the memory module pops up.
5. Remove the memory module from the connector.




| | | | |
|---|---|---|---|
| 1 | memory module | 2 | securing clips (2) |
| 3 | DIMM A and DIMM B | 4 | DIMM C and DIMM D |

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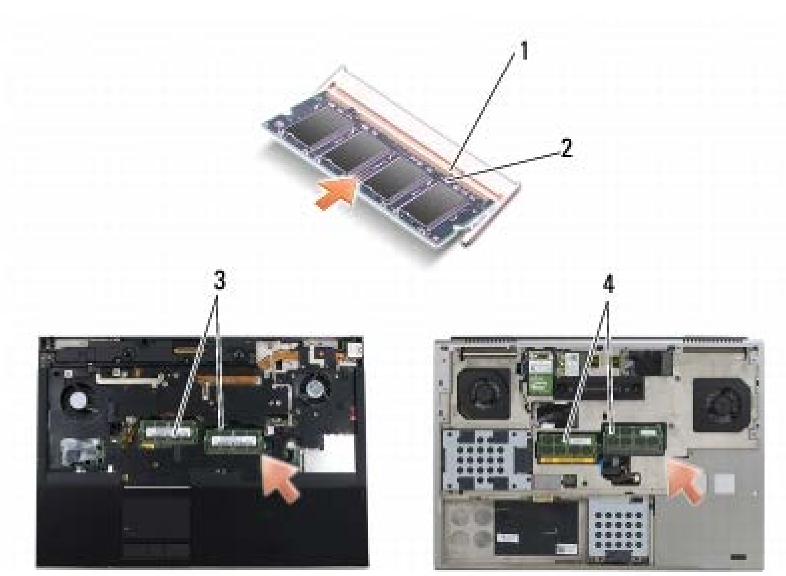
# Replacing a Memory Module

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Place the module at a 45-degree angle, and align the notch in the module with the tab on the connector.

**NOTE:** If the memory module is not installed properly, the computer may not boot. No error message indicates this failure.

2. Press down on the module until it clicks into place. If the module does not click into place, remove the module and reinstall it.



| | | | |
|---|---|---|---|
| 1 | tab | 2 | notch |
| 3 | DIMM A and DIMM B | 4 | DIMM C and DIMM D |

3. To replace DIMM A or DIMM B:

   a. Replace the keyboard (see Replacing the Keyboard).

   b. Replace the LED cover (see Replacing the LED Cover).

4. To replace DIMM C or DIMM D:

   a. Replace the base assembly cover (see Replacing the Base Assembly Cover).

5. Follow the procedures in After Working on Your Computer.

As the computer boots, it detects the additional memory and automatically updates the system configuration information. To confirm the amount of memory installed in the computer:

- *In Microsoft® Windows® XP*, right-click the **My Computer** icon on your desktop. Click **Properties**® **General**.
- *In Windows Vista*, click **Start** ® **Help and Support**® **Dell System Information**.

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# Coin-Cell Battery

**Dell Precision™ M6400 Service Manual**



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## Removing the Coin-Cell Battery

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the procedures in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Slide the coin-cell battery out of the mylar sleeve.
4. Disconnect the coin-cell battery cable from the system board.



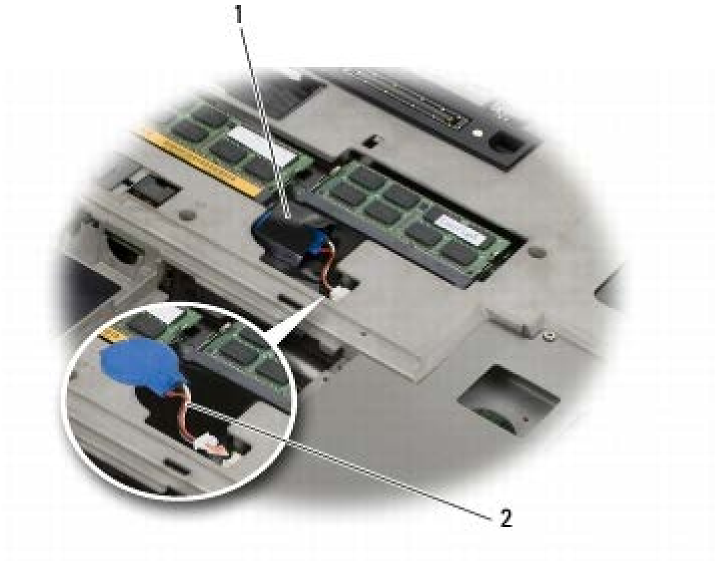

| | | | |
|---|---|---|---|
| 1 | coin-cell battery | 2 | coin-cell battery cable |

---

## Replacing the Coin-Cell Battery

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Connect the coin-cell battery cable to the system board.
2. Slide the coin-cell battery into the mylar sleeve.




| | | | |
|---|---|---|---|
| 1 | coin-cell battery | 2 | coin-cell battery cable |

3. Replace the base assembly cover (see Replacing the Base Assembly Cover).

4. Follow the procedures in After Working on Your Computer.

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# LED Cover

**Dell Precision™ M6400 Service Manual**



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## Removing the LED Cover

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the procedures in Before Working on Your Computer.
2. Starting on the left, gently lift the LED cover and disconnect the power cable and the biometer cable if present.




| | | | |
|---|---|---|---|
| 1 | LED cover | 2 | power cable |
| 3 | biometer cable | | |

---

## Replacing the LED Cover

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

3. Connect the power cable and, if present, the biometer cable to the LED cover.
4. Starting with the right, snap the LED cover into place.
5. Follow the procedures in After Working on Your Computer.

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# Keyboard

**Dell Precision™ M6400 Service Manual**



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## Removing the Keyboard

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the procedures in Before Working on Your Computer.
2. Remove the LED cover (see Removing the LED Cover).
3. Remove the four M2 x 3-mm screws along the top of the keyboard.

**NOTICE: The key caps on the keyboard are fragile, easily dislodged, and time- consuming to replace. Exercise care when removing and handling the keyboard.**

4. Use the metal pull tabs to gently slide the keyboard toward the back of the computer to disconnect the keyboard.




| | | | |
|---|---|---|---|
| 1 | M2 x 3-mm screws (4) | 2 | metal pull tabs (3) |
| 3 | keyboard | | |

---

## Replacing the Keyboard

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**NOTICE: The key caps on the keyboard are fragile, easily dislodged, and time- consuming to replace. Exercise care when removing and handling the keyboard.**

1. Align the notch on the center metal pull tab with the alignment tab on the computer.
2. Slide the keyboard toward the front of the computer ensuring that the alignment tab on the computer remains engaged and the tabs and keyboard connector slide under the palm rest.
3. Replace the four M2 x 3-mm screws on the keyboard.




| | | | |
|---|---|---|---|
| 1 | M2 x 3-mm screws (4) | 2 | alignment tab |
| 3 | notch | 4 | keyboard connector |
| 5 | tabs (5) | | |

4. Replace the LED cover (see Replacing the LED Cover).
5. Follow the procedures in After Working on Your Computer.

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# Edge-to-Edge Display

**Dell Precision™ M6400 Service Manual**



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## Removing the Edge-to-Edge Display

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

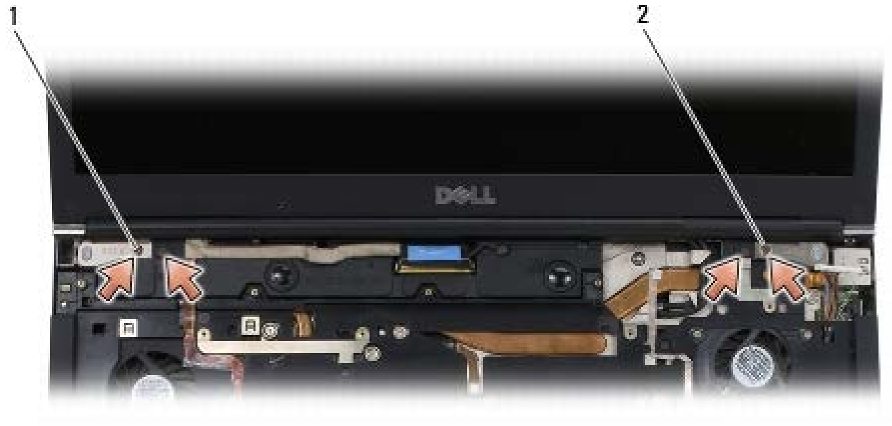
**NOTE:** The color of your computer and certain computer components may appear differently than shown in this document.

1. Follow the instructions in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Where applicable, disconnect and unroute the antenna cables from the WLAN, WWAN, and WPAN cards.
4. Remove two M2.5 x 8-mm screws from the back of the base assembly and two M2.5 x 8-mm screws from the bottom of the base assembly.




| | | | |
|---|---|---|---|
| 1 | M2.5 x 8-mm screws (2) (back of base assembly) | 2 | WPAN antenna cable |
| 3 | WLAN antenna cable | 4 | WWAN antenna cable |
| 5 | M2.5 x 8-mm screws (2) (bottom of base assembly) | | |

5. Turn the computer topside up and open the display.
6. Remove the LED cover (see Removing the LED Cover).
7. Remove the keyboard (see Removing the Keyboard).
8. Remove the two M2.5 x 5-mm screws from the right hinge, and remove the two M2.5 x 5-mm screws from the left hinge.




| | | | |
|---|---|---|---|
| 1 | M2.5 x 5-mm screws (2) on left hinge | 2 | M2.5 x 5-mm screws (2) on right hinge |

9. Pull the wireless antenna cables up through the computer.
10. Remove the LVDS captive screw.
11. Disconnect and unroute the display cable.
12. Disconnect and unroute the ambient-light sensor cable.
13. Lift the Edge-to-Edge display off the base assembly.




| | | | |
|---|---|---|---|
| 1 | ambient-light display sensor cable | 2 | base assembly |
| 3 | display assembly | 4 | antenna cables |
| 5 | LVDS captive screw | 6 | display cable |

# Replacing the Edge-to-Edge Display

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Align the hinges with the holes in the base assembly, and lower the display into place.
2. Replace the two M2.5 x 5-mm screws in the right hinge and the two M2.5 x 5-mm screws in the left hinge.
3. Route and connect the ambient-light sensor cable.
4. Route and connect the display cable.
5. Replace the LVDS captive screw.
6. Thread the WWAN, WLAN, and WPAN antenna cables through the computer.
7. Replace the keyboard (see Replacing the Keyboard).
8. Replace the LED cover (see Replacing the LED Cover).
9. Close the display and turn the computer upside down.
10. Replace the two M2.5 x 8-mm screws on the back of the base assembly and the two M2.5 x 8-mm screws on the bottom of the base assembly.
11. Route the wireless antenna cables. Ensure you route the cables under each tab in the routing channels.
12. Depending on the cards in your computer configuration, connect the antenna cables to the WWAN, WLAN, and WPAN cards (see Replacing a WWAN Card, Replacing the WLAN/WiMax Card, and Replacing a WPAN Card).

    Place any unused antenna cables in the base assembly cable holders next to the card slot.
13. Replace the base assembly cover (see Replacing the Base Assembly Cover).
14. Follow the procedures in After Working on Your Computer.

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# LED and CCFL Displays

**Dell Precision™ M6400 Service Manual**



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## Removing the Display Bezel

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**NOTICE: Removal of the bezel from the display requires extreme care to avoid damage to the bezel.**

**NOTE:** The color of your computer and certain computer components may appear differently than shown in this document.

1. Follow the instructions in Before Working on Your Computer.
2. Remove the two M2.5 x 5-mm screws along the bottom of the bezel.

   **NOTE:** Removing the bezel is a series of disengaging the tabs on the bezel from the display cover.

3. Starting at the bottom of the bezel, pull up in the middle, then pull in and up on the bottom right and bottom left.
4. On the left and right sides of the bezel, pull out and then lift.
5. Continue to lift the bezel up at an angle to remove the top of the bezel.




| | | | |
|---|---|---|---|
| 1 | left side of bezel | 2 | top of bezel |
| 3 | right side of bezel | 4 | M2.5 x 5-mm screws (2) |
| 5 | display assembly | 6 | bottom of bezel |

## Replacing the Display Bezel

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Angle the bottom of the bezel in under the hinges, then firmly press the center of the bottom of the bezel into place.
2. Push in on the left and right sides of the bezel and ensure the tabs connect inside the display cover.
3. Firmly press along the top to snap the bezel into place.
4. Replace the two M2.5 x 5-mm screws on the bottom of the bezel.




| | | | |
|---|---|---|---|
| 1 | display bezel | 2 | M2.5 x 5-mm screws (2) |
| 3 | hinges | 4 | display cover |

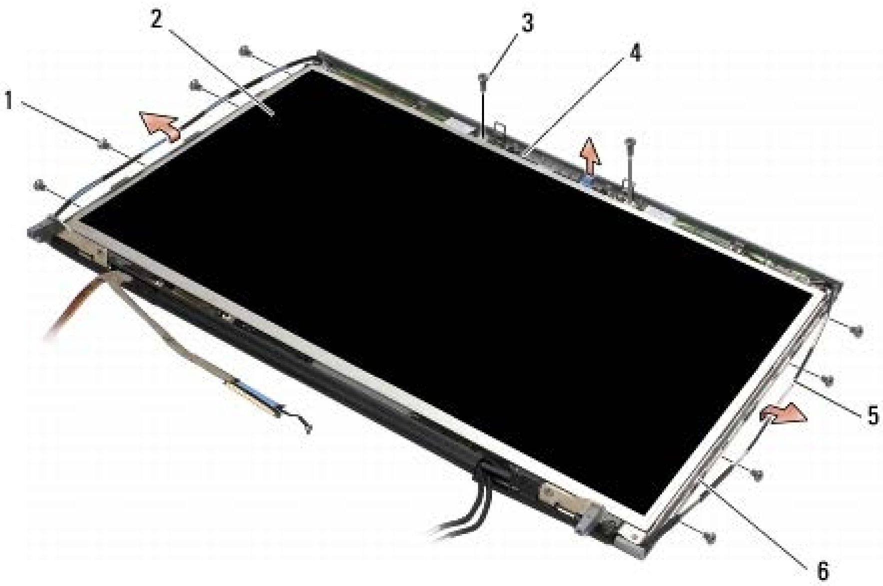
5. Follow the procedures in After Working on Your Computer.

---

# Removing the Display Panel

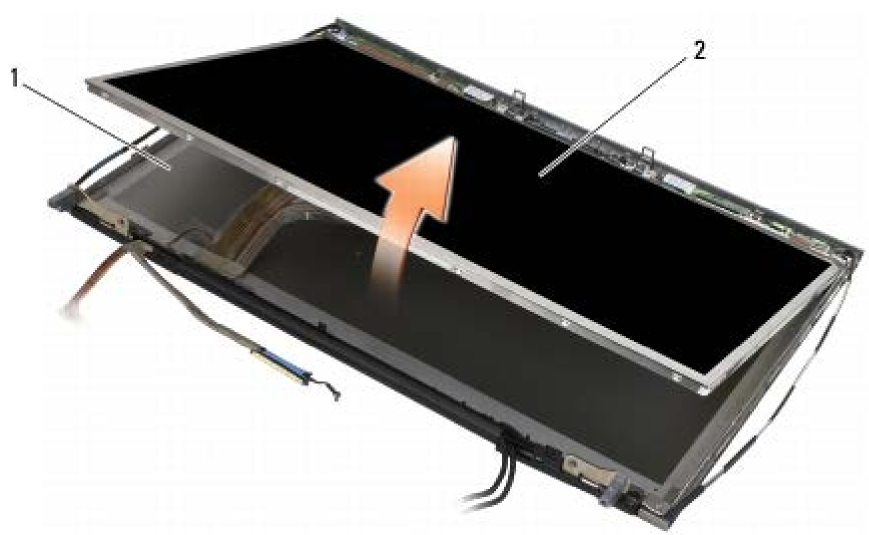
**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.
2. Remove the display bezel (see Removing the Display Bezel).
3. Move the antenna cables slightly out of the way to remove the eight M2 x 3-mm screws from the display panel.
4. Remove the two M2 x 3-mm screws from bracket on the display panel.




| | | | |
|---|---|---|---|
| 1 | M2 x 3-mm screws (8) | 2 | display panel |
| 3 | M2 x 3-mm screws (2) | 4 | bracket |
| 5 | antenna cables | 5 | display cover |

5. Lift the display panel out of the display cover.




| | | | |
|---|---|---|---|
| 1 | display cover | 2 | display panel |

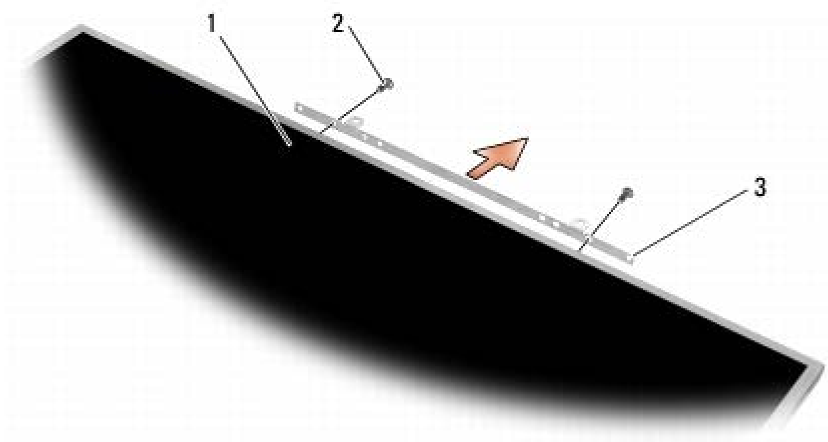
**NOTE:** The number of cables on your display panel may vary depending on the type of display.

6. Squeeze the release tabs together to disconnect the cables.




| | | | |
|---|---|---|---|
| 1 | underside of display panel | 2 | cables (2) |
| 3 | cable connector | 4 | cable connector |
| 5 | release tabs | | |

7. Remove two M2 x 3-mm screws along the top of the panel to remove the bracket.




| | | | |
|---|---|---|---|
| 1 | display panel | 2 | M2 x 3-mm screws (2) |
| 3 | bracket | | |

---

## Replacing the Display Panel

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Replace the two M2 x 3-mm screws to secure the bracket to the display panel.
2. Connect the cables to the connectors on the back of the display panel.
3. Place the display panel in display cover.
4. Replace the ten M2 x 3-mm screws that secure the display panel to the display cover (four screws on each side and

two in the bracket along the top of the display panel.

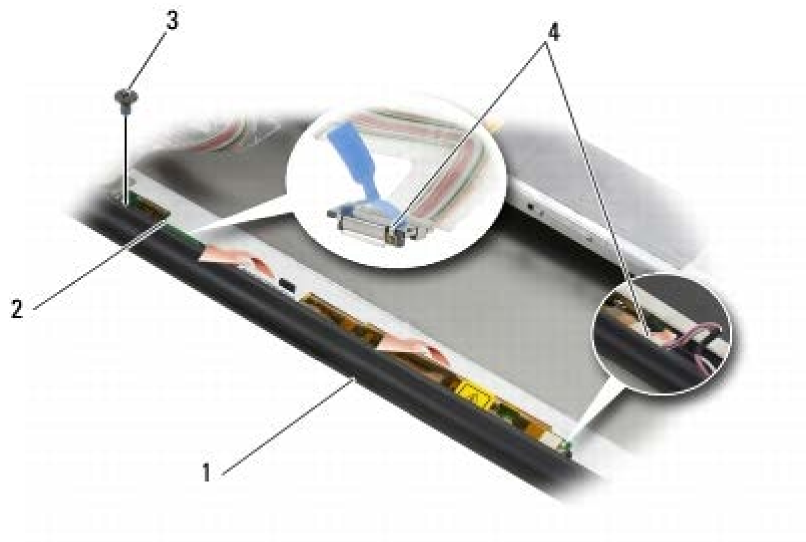
5. Replace the display bezel (see Replacing the Display Bezel).
6. Follow the procedures in After Working on Your Computer.

---

# Removing the Inverter Board (CCFL Display Only)

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.
2. Remove the display bezel (see Removing the Display Bezel).
3. Disconnect the inverter cables from the inverter board.
4. Remove the M2 x 3-mm screws from the inverter board, and lift the inverter board out of the display cover.




| | | | |
|---|---|---|---|
| 1 | display cover | 2 | inverter board |
| 3 | M2 x 3-mm screw | 4 | inverter cables (2) |

---

# Replacing the Inverter Board (CCFL Display Only)

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Place the inverter board in the display cover.
2. Connect the inverter cables to the inverter board.
3. Replace the M2 x 3-mm screw.
4. Replace the display bezel (see Replacing the Display Bezel).

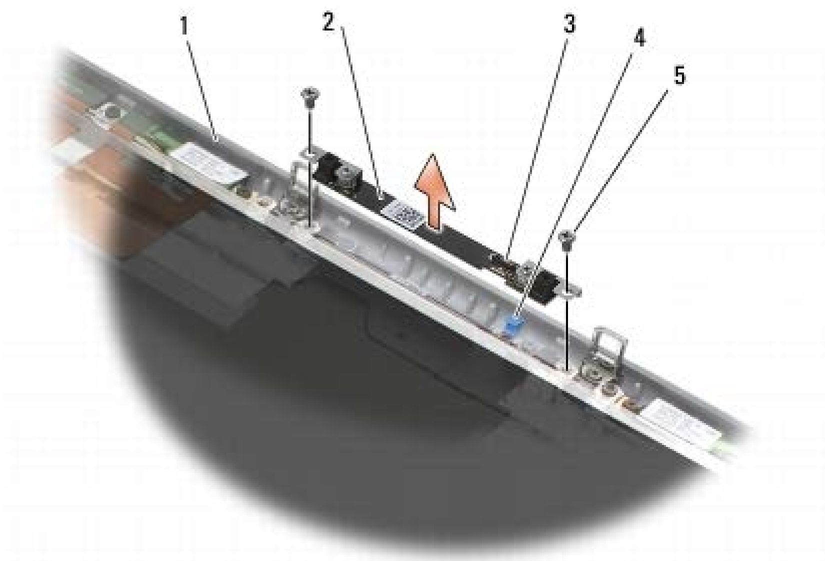
5. Follow the procedures in After Working on Your Computer.

## Removing the Microphone/Camera Board

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**NOTE:** Camera is optional and may not be included on your computer.

1. Follow the instructions in Before Working on Your Computer.
2. Remove the display bezel (see Removing the Display Bezel).
3. Disconnect the cable from the microphone/camera board.
4. Remove the two M2.5 x 5-mm screws, and remove the microphone/camera board.




| | | | |
|---|---|---|---|
| 1 | display cover | 2 | microphone/camera board |
| 3 | cable connector | 4 | cable |
| 5 | M2.5 x 5-mm screws (2) | | |

## Replacing the Microphone/Camera Board

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Lift the cable out of the way and place the microphone/camera board in the display cover.
2. Connect the cable to the microphone/camera board.
3. Replace the two M2.5 x 5-mm screws.
4. Replace the display bezel (see Replacing the Display Bezel).

5. Follow the procedures in After Working on Your Computer.

---

# Removing the Display Assembly

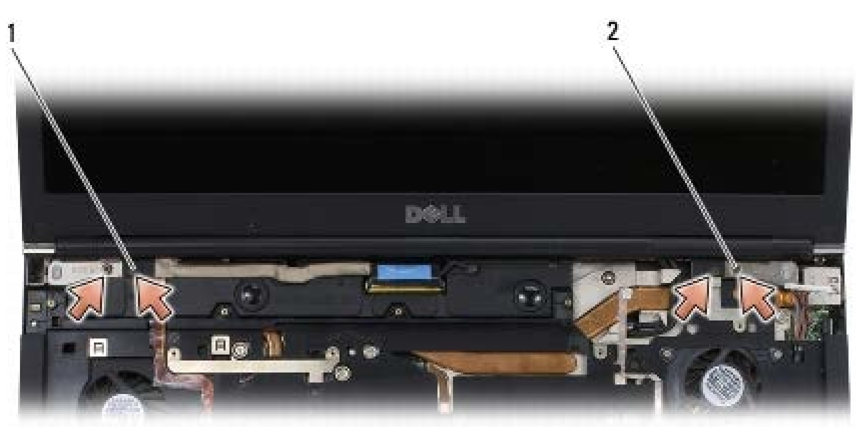
**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Where applicable, disconnect and unroute the antenna cables from the WLAN, WWAN, and WPAN cards.
4. Remove two M2.5 x 8-mm screws from the back of the base assembly and two M2.5 x 8-mm screws from the bottom of the base assembly.




| | | | |
|---|---|---|---|
| 1 | M2.5 x 8-mm screws (2) (back of base assembly) | 2 | WPAN antenna cable |
| 3 | WLAN antenna cable | 4 | WWAN antenna cable |
| 5 | M2.5 x 8-mm screws (2) (bottom of base assembly) | | |

5. Turn the computer topside up and open the display.
6. Remove the LED cover (see Removing the LED Cover).
7. Remove the keyboard (see Removing the Keyboard).
8. Remove the two M2.5 x 5-mm screws from the right hinge, and remove the two M2.5 x 5-mm screws from the left hinge.



| | | | |
|---|---|---|---|
| 1 | M2.5 x 5-mm screws (2) on left hinge | 2 | M2.5 x 5-mm screws (2) on right hinge |

9. Pull the wireless antenna cables up through the computer.
10. Remove the LVDS captive screw.
11. Disconnect and unroute the display cable.
12. Disconnect and unroute the ambient-light sensor cable.
13. Lift the display off the base assembly.




| | | | |
|---|---|---|---|
| 1 | ambient-light sensor cable | 2 | base assembly |
| 3 | display assembly | 4 | antenna cables |
| 5 | LVDS captive screw | 6 | display cable |

---

## Replacing the Display Assembly

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Align the hinges with the holes in the base assembly, and lower the display into place.
2. Replace the two M2.5 x 5-mm screws in the right hinge and the two M2.5 x 5-mm screws in the left hinge.
3. Route and connect the ambient-light sensor cable.
4. Route and connect the display cable.

5. Replace the LVDS captive screw.

6. Thread the WWAN, WLAN, and WPAN antenna cables through the computer.

7. Replace the keyboard (see Replacing the Keyboard).

8. Replace the LED cover (see Replacing the LED Cover).

9. Close the display and turn the computer upside down.

10. Replace the two M2.5 x 8-mm screws on the back of the base assembly and the two M2.5 x 8-mm screws on the bottom of the base assembly.

11. Route the wireless antenna cables. Ensure you route the cables under each tab in the routing channels.

12. Depending on the cards in your computer configuration, connect the antenna cables to the WWAN, WLAN, and WPAN cards (see Replacing a WWAN Card, Replacing the WLAN/WiMax Card, and Replacing a WPAN Card).

    Place any unused antenna cables in the base assembly cable holders next to the card slot.

13. Replace the base assembly cover (see Replacing the Base Assembly Cover).

14. Follow the procedures in After Working on Your Computer.

---

# Removing the Display Cover

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.

2. Remove the display assembly (see Removing the Display Assembly).

3. Remove the display bezel (see Removing the Display Bezel).

**NOTE:** It is not necessary to remove the brackets from the display panels in the next step.

4. Remove the display panel from the display cover (see Removing the Display Panel).

---

# Replacing the Display Cover

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Remove the tape from the cables that are taped to the display cover.

2. Replace the display panel (see Replacing the Display Panel).

3. Replace the display bezel (see Replacing the Display Bezel).

4. Replace the display assembly (see Replacing the Display Assembly).

5. Follow the procedures in After Working on Your Computer.

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# Palm Rest Assembly

**Dell Precision™ M6400 Service Manual**



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## Removing the Palm Rest Assembly

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Remove the secondary hard drive (see Removing the Secondary Hard Drive (HDD2)).
4. Remove the optical drive (see Removing the Optical Drive).
5. Remove the four M2.5 x 8-mm screws labeled "P" on the bottom of the computer.




| | | | |
|---|---|---|---|
| 1 | M2.5 x 8-mm screws (4) | | |

6. Remove the display assembly (see Removing the Edge-to-Edge Display or Removing the Display Assembly).
7. Remove the LED cover (see Removing the LED Cover).
8. Remove the keyboard (see Removing the Keyboard).
9. Remove the nine M2 x 3-mm screws (labeled "P").

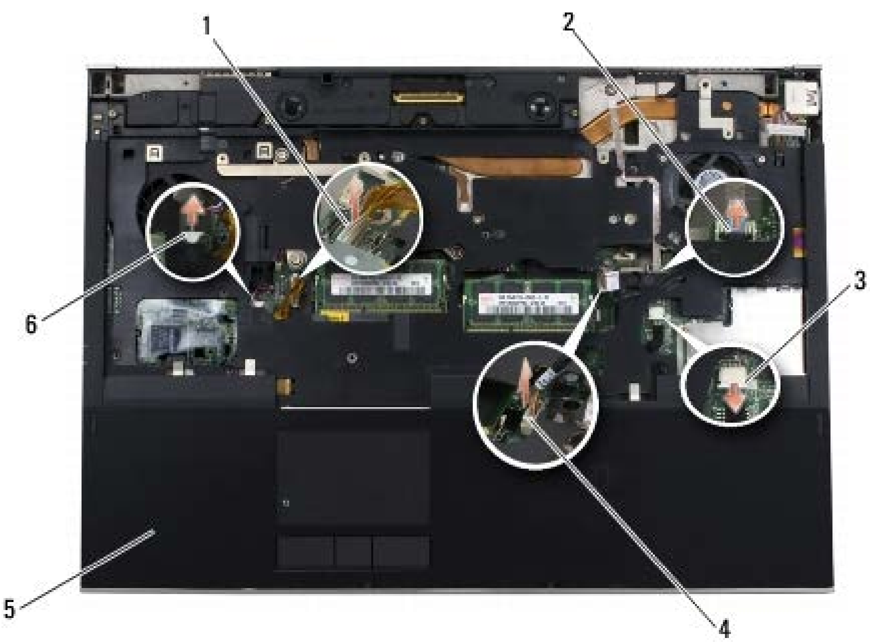



| | | | |
|---|---|---|---|
| 1 | 2 x 3-mm screws (9) | | |

10. Disconnect the biometer, speaker, touch pad, contactless smart card, and power cables from the system board.

**NOTICE: Do not use force to separate the palm rest from the computer. If you encounter resistance, gently flex or apply pressure to the palm rest, or move along the edge, working away from the area of resistance, until the palm rest is free.**

11. Carefully lift the center of the palm rest to remove it from the computer.




| | | | |
|---|---|---|---|
| 1 | touch pad cable | 2 | biometer cable |
| 3 | contactless smart card cable | 4 | power cable |
| 5 | palm rest | 6 | speaker cable |

---

# Replacing the Palm Rest Assembly

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Place the palm rest on the computer, then gently press around the edges to firmly snap the palm rest to the base assembly.
2. Connect the biometer, contactless smart card, touchpad, speaker, and power cables to the system board.
3. Replace the nine M2 x 3-mm screws in the holes labeled "P".
4. Replace the keyboard (see Replacing the Keyboard).
5. Replace the LED cover (see Replacing the LED Cover).
6. Replace the display assembly (see Replacing the Edge-to-Edge Display or Replacing the Display Assembly).
7. Turn the computer upside down, and replace the four M2.5 x 8-mm screws in the holes labeled "P".
8. Replace the optical drive (see Replacing the Optical Drive).
9. Replace the secondary hard drive (see Replacing the Secondary Hard Drive (HDD2)).
10. Replace the base assembly cover (see Replacing the Base Assembly Cover).
11. Follow the procedures in After Working on Your Computer.

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# Fan

**Dell Precision™ M6400 Service Manual**

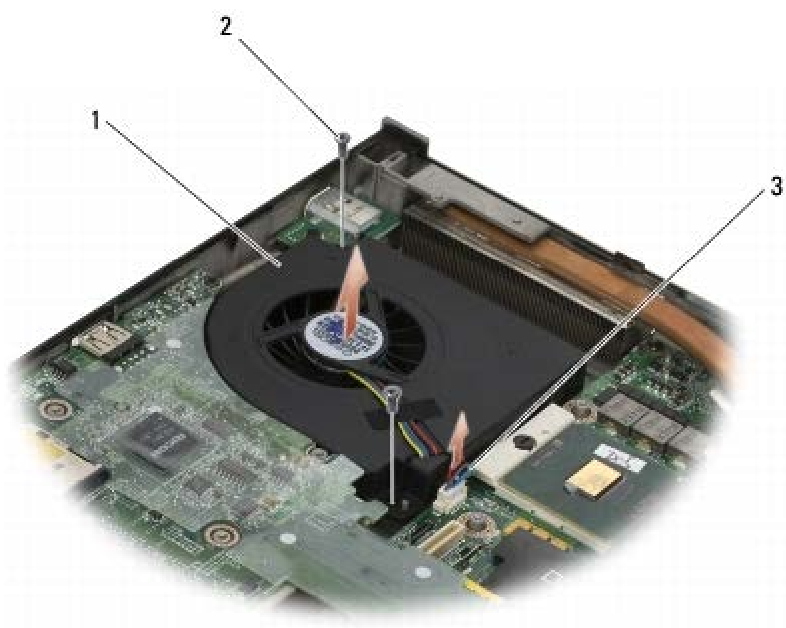


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## Removing the Fan

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Remove the secondary hard drive (see Removing the Secondary Hard Drive (HDD2)).
4. Remove the display assembly (see Removing the Edge-to-Edge Display or Removing the Display Assembly).
5. Remove the LED cover (see Removing the LED Cover).
6. Remove the keyboard (see Removing the Keyboard).
7. Remove the palm rest (see Removing the Palm Rest Assembly).
8. Disconnect the fan cable from the system board.
9. Remove the two M2.5 x 5-mm screws that secure the fan to the base.
10. Lift the fan up to remove it.




| | | | |
|---|---|---|---|
| 1 | fan | 2 | M2.5 x 5-mm screws (2) |
| | | | |

| | | | |
|---|---|---|---|
| 3 | fan cable | | |

## Replacing the Fan

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Place the fan on the base ensuring the posts on the base align with the holes on the fan.
2. Replace the two M2.5 x 5-mm screws.
3. Connect the fan cable to the system board.
4. Replace the palm rest (see Replacing the Palm Rest Assembly).
5. Replace the keyboard (see Replacing the Keyboard).
6. Replace the LED cover (see Replacing the LED Cover).
7. Replace the display assembly (see Replacing the Edge-to-Edge Display or Replacing the Display Assembly).
8. Replace the secondary hard drive (see Replacing the Secondary Hard Drive (HDD2)).
9. Replace the base assembly cover (see Replacing the Base Assembly Cover).
10. Follow the procedures in After Working on Your Computer.

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# Processor Heatsink Assembly

**Dell Precision™ M6400 Service Manual**

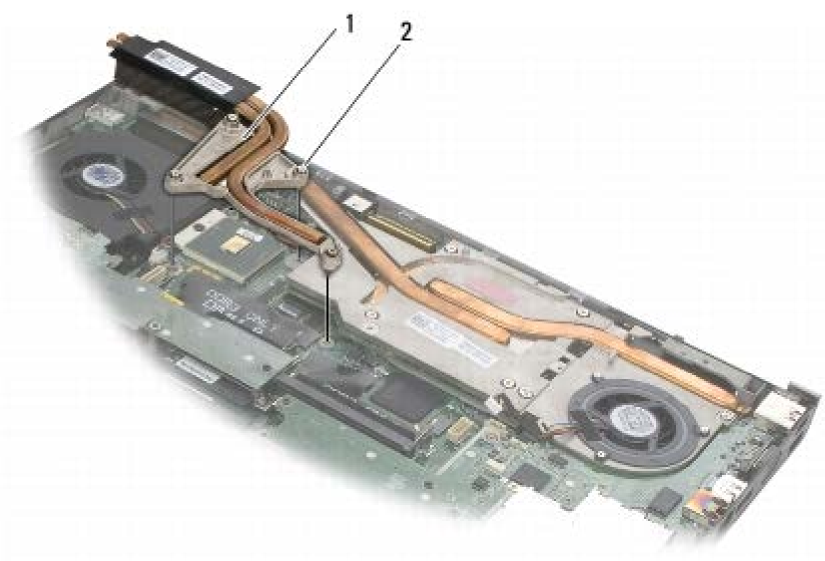


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## Removing the Processor Heatsink Assembly

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Remove the secondary hard drive (see Removing the Secondary Hard Drive (HDD2)).
4. Remove the display assembly (see Removing the Edge-to-Edge Display or Removing the Display Assembly).
5. Remove the LED cover (see Removing the LED Cover).
6. Remove the keyboard (see Removing the Keyboard).
7. Remove the palm rest (see Removing the Palm Rest Assembly).
8. Remove the fan (see Removing the Fan).
9. In sequential order, loosen the four captive screws that secure the processor heatsink assembly to the system board.
10. Lift the processor heatsink assembly to remove it.




| | | | |
|---|---|---|---|
| 1 | processor heatsink assembly | 2 | captive screws (4) |

---

# Replacing the Processor Heatsink Assembly

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Align the four captive screws on the processor heatsink assembly with the screw holes on the system board.
2. In sequential order, tighten the four captive screws to secure the processor heatsink assembly to the system board.
3. Replace the fan (see Replacing the Fan).
4. Replace the palm rest (see Replacing the Palm Rest Assembly).
5. Replace the keyboard (see Replacing the Keyboard).
6. Replace the LED cover (see Replacing the LED Cover).
7. Replace the display assembly (see Replacing the Edge-to-Edge Display or Replacing the Display Assembly).
8. Replace the secondary hard drive (see Replacing the Secondary Hard Drive (HDD2)).
9. Replace the base assembly cover (see Replacing the Base Assembly Cover).
10. Follow the procedures in After Working on Your Computer.

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# Video Card/Heatsink Assembly

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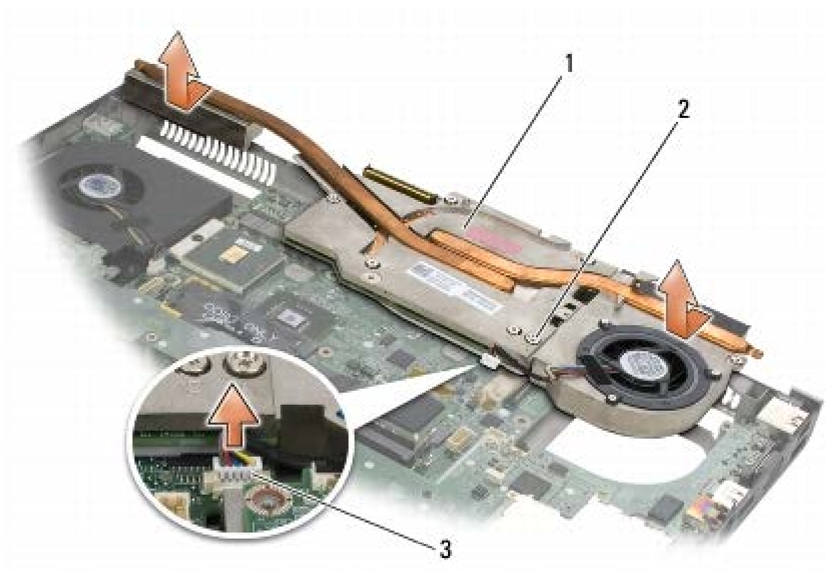


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## Removing the Video Card/Heatsink Assembly

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Remove the secondary hard drive (see Removing the Secondary Hard Drive (HDD2)).
4. Remove the LED cover (see Removing the LED Cover).
5. Remove the keyboard (see Removing the Keyboard).
6. Remove the display assembly (see Removing the Edge-to-Edge Display or Removing the Display Assembly).
7. Remove the palm rest (see Removing the Palm Rest Assembly).
8. Remove the processor heatsink assembly (see Removing the Processor Heatsink Assembly).
9. Loosen the three captive screws on the video card/heatsink assembly.
10. Disconnect the fan cable.
11. Lift the video card/heatsink assembly to remove it.



| | | | |
|---|---|---|---|
| 1 | video card/heatsink assembly | 2 | captive screws (3) |
| 3 | fan cable | | |

## Replacing the Video Card/Heatsink Assembly

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Replace the video card/heatsink assembly at a slight angle to fit it in under the rim of the base assembly.
2. Tighten the three captive screws to secure the video card/heatsink assembly to the system board.
3. Connect the fan cable.
4. Replace the processor heatsink assembly (see Replacing the Processor Heatsink Assembly).
5. Replace the palm rest (see Replacing the Palm Rest Assembly).
6. Replace the display assembly (see Replacing the Edge-to-Edge Display or Replacing the Display Assembly).
7. Replace the keyboard (see Replacing the Keyboard).
8. Replace the LED cover (see Replacing the LED Cover).
9. Replace the secondary hard drive (see Replacing the Secondary Hard Drive (HDD2)).
10. Replace the base assembly cover (see Replacing the Base Assembly Cover).
11. Follow the procedures in After Working on Your Computer.

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# Processor Module

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## Removing the Processor Module

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.
2. Remove the bottom of the computer (see Removing the Base Assembly Cover).
3. Remove the secondary hard drive (see Removing the Secondary Hard Drive (HDD2)).
4. Remove the display assembly (see Removing the Edge-to-Edge Display or Removing the Display Assembly).
5. Remove the LED cover (see Removing the LED Cover).
6. Remove the keyboard (see Removing the Keyboard).
7. Remove the palm rest (see Removing the Palm Rest Assembly).
8. Remove the fan (see Removing the Fan).
9. Remove the processor heatsink assembly (see Removing the Processor Heatsink Assembly).
10. Remove the video card/heatsink assembly (see Removing the Video Card/Heatsink Assembly).




| | | | |
|---|---|---|---|
| 1 | processor module | | |

**NOTICE: To avoid damage to the processor, hold the screwdriver so that it is perpendicular to the processor when turning the cam screw.**

11. To loosen the ZIF socket, use a small, flat-blade screwdriver and rotate the ZIF-socket cam screw counterclockwise

until it comes to the cam stop.




| | | | |
|---|---|---|---|
| 1 | ZIF socket | 2 | ZIF-socket cam screw |

**NOTICE: To ensure maximum cooling for the processor, do not touch the heat transfer areas on the processor heatsink assembly. The oils in your skin can reduce the heat transfer capability of the thermal pads.**

**NOTICE: When removing the processor module, pull the module straight up. Be careful not to bend the pins on the processor module.**

12. Lift the processor module from the ZIF socket.

---

# Replacing the Processor Module

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**NOTICE: Do not touch the processor die. Press and hold the processor down on the substrate on which the die is mounted while turning the cam screw to prevent intermittent contact between the cam screw and processor.**

**NOTICE: Ensure that the cam lock is in the fully open position before seating the processor module. Seating the processor module properly in the ZIF socket does not require force. A processor module that is not properly seated can result in an intermittent connection or permanent damage to the microprocessor and ZIF socket.**

**NOTE:** If a new processor is installed, you will receive a new heatsink assembly, which will include an affixed thermal pad, or you will receive a new thermal pad along with a tech sheet to illustrate proper installation.

1. Align the pin-1 corner of the processor module with the pin-1 corner of the ZIF socket, then insert the processor module.

   **NOTE:** The pin-1 corner of the processor module has a triangle that aligns with the triangle on the pin-1 corner of the ZIF socket.

When the processor module is properly seated, all four corners are aligned at the same height. If one or more corners of the module are higher than the others, the module is not seated properly.




| | | | |
|---|---|---|---|
| 1 | ZIF socket | 2 | pin-1 corner |
| 3 | ZIF-socket cam screw | | |

**NOTICE: To avoid damage to the processor, hold the screwdriver so that it is perpendicular to the processor when turning the cam screw.**

2. Tighten the ZIF socket by turning the cam screw clockwise to secure the processor module to the system board.
3. Replace the video card/heatsink assembly (see Replacing the Video Card/Heatsink Assembly).
4. Replace the processor heatsink assembly (see Replacing the Processor Heatsink Assembly).
5. Replace the fan (see Replacing the Fan).
6. Replace the palm rest (see Replacing the Palm Rest Assembly).
7. Replace the keyboard (see Replacing the Keyboard).
8. Replace the LED cover (see Replacing the LED Cover).
9. Replace the display assembly (see Replacing the Edge-to-Edge Display or Replacing the Display Assembly).
10. Replace the secondary hard drive (see Replacing the Secondary Hard Drive (HDD2)).
11. Replace the base assembly cover (see Replacing the Base Assembly Cover).
12. Follow the procedures in After Working on Your Computer.

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# Card Cage

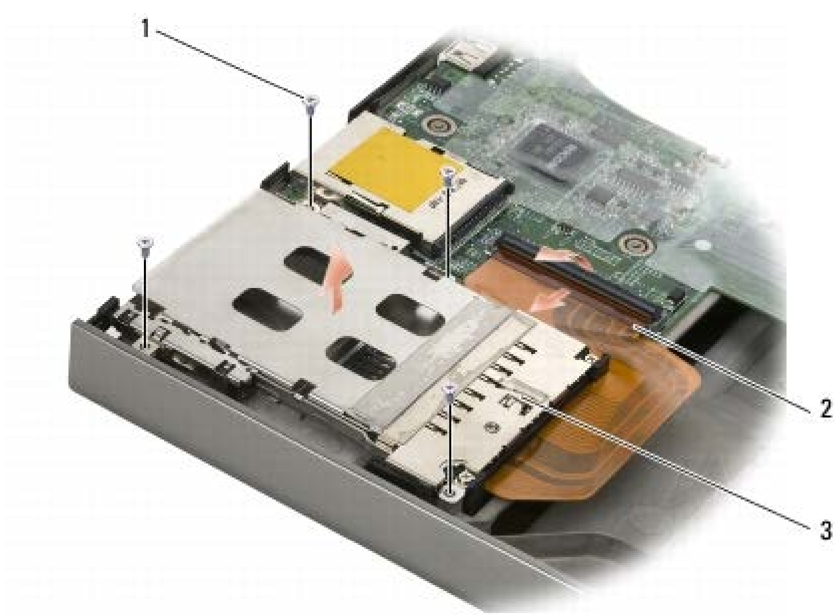
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## Removing the Card Cage

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the procedures in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Remove the secondary hard drive (see Removing the Secondary Hard Drive (HDD2)).
4. Remove the display assembly (see Removing the Edge-to-Edge Display or Removing the Display Assembly).
5. Remove the LED cover (see Removing the LED Cover).
6. Remove the keyboard (see Removing the Keyboard).
7. Remove the palm rest (see Removing the Palm Rest Assembly).
8. If a card is in the card cage, remove the card.
9. Disconnect the card cable from the I/O board.
10. Remove the four M2 x 3-mm screws.
11. Lift to remove the card cage.




| | | | |
|---|---|---|---|
| 1 | M2 x 3-mm screws (4) | 2 | card cable |
| 3 | card cage | | |

# Replacing the Card Cage

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Connect the card cable to the I/O board.
2. Place the card cage on the base assembly.
3. Replace the four M2 x 3-mm screws.
4. Replace the palm rest (see Replacing the Palm Rest Assembly).
5. Replace the keyboard (see Replacing the Keyboard).
6. Replace the LED cover (see Replacing the LED Cover).
7. Replace the display assembly (see Replacing the Edge-to-Edge Display or Replacing the Display Assembly).
8. Replace the secondary hard drive (see Replacing the Secondary Hard Drive (HDD2)).
9. Replace the base assembly cover (see Replacing the Base Assembly Cover).
10. Follow the procedures in After Working on Your Computer.

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# IEEE 1394 Card

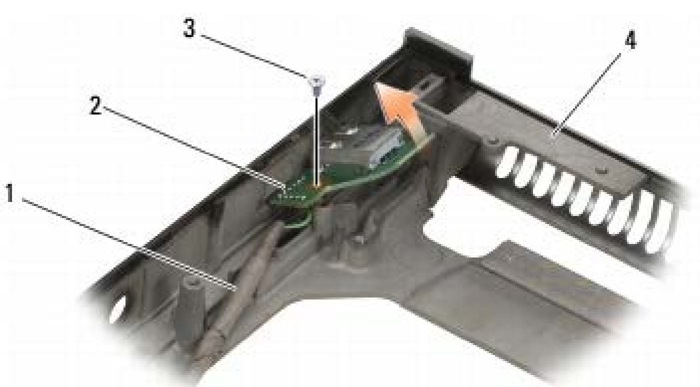
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## Removing the IEEE 1394 Card

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Remove the secondary hard drive (see Removing the Secondary Hard Drive (HDD2)).
4. Remove the display assembly (see Removing the Edge-to-Edge Display or Removing the Display Assembly).
5. Remove the LED cover (see Removing the LED Cover).
6. Remove the keyboard (see Removing the Keyboard).
7. Remove the palm rest (see Removing the Palm Rest Assembly).
8. Remove the card cage (see Removing the Card Cage).
9. Remove the left I/O board (see Removing the Left I/O Board).
10. Remove the M2 x 3-mm screw.
11. Remove the IEEE 1394 card.




| | | | |
|---|---|---|---|
| 1 | IEEE 1394 card cable | 2 | IEEE 1394 card |
| 3 | M2 x 3-mm screw | 4 | base assembly |

## Replacing the IEEE 1394 Card

**CAUTION: Before working inside your computer, read the safety information that shipped with your**

**computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Place the IEEE 1394 card in at an angle to fit the connector into the base assembly.
2. Replace the M2 x 3-mm screw.
3. Replace the left I/O board (see Replacing the Left I/O Board).
4. Replace the card cage (see Replacing the Card Cage).
5. Replace the palm rest assembly (Replacing the Palm Rest Assembly).
6. Replace the keyboard (see Replacing the Keyboard).
7. Replace the LED cover (see Replacing the LED Cover).
8. Replace the display assembly (see Replacing the Edge-to-Edge Display or Replacing the Display Assembly).
9. Replace the secondary hard drive (see Replacing the Secondary Hard Drive (HDD2)).
10. Replace the base assembly cover (see Replacing the Base Assembly Cover).
11. Follow the procedures in After Working on Your Computer.

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# Left I/O Board

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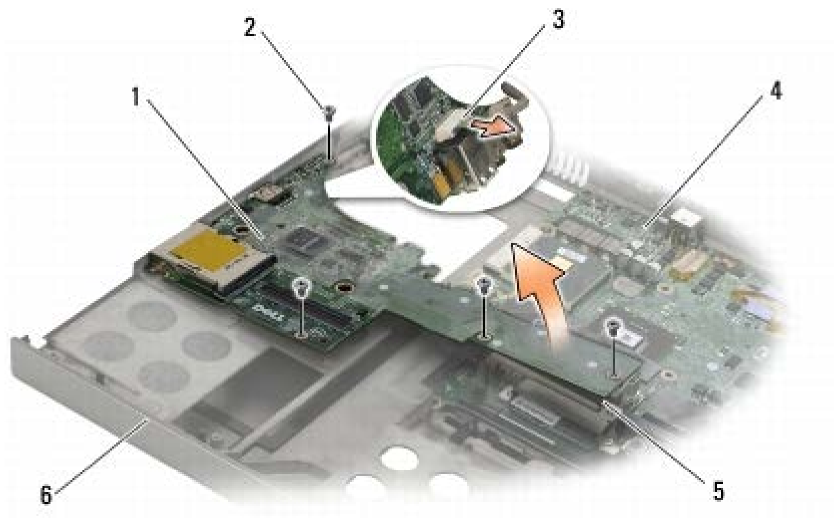


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## Removing the Left I/O Board

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Remove the secondary hard drive (see Removing the Secondary Hard Drive (HDD2)).
4. Remove the display assembly (see Removing the Edge-to-Edge Display or Removing the Display Assembly).
5. Remove the LED cover (see Removing the LED Cover).
6. Remove the keyboard (see Removing the Keyboard).
7. Remove the palm rest (see Removing the Palm Rest Assembly).
8. Remove the card cage (see Removing the Card Cage).
9. Remove the four M2 x 3-mm screws on the left I/O board.
10. Lift the left I/O board at an angle to ease the connectors from the base assembly
11. Disconnect the IEEE 1394 cable from the underside of the left I/O board.




| | | | |
|---|---|---|---|
| 1 | left I/O board | 2 | M2 x 3-mm screws (4) |
| 3 | IEEE 1394 cable | 4 | system board |
| 5 | system board connector | 6 | base assembly |

# Replacing the Left I/O Board

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Connect the IEEE 1394 cable to the connector on the underside of the left I/O board.
2. Align the connectors on the left I/O board with the connector slots on the base assembly.
3. Set the left I/O board in at an angle and press down on the board to ensure it connects firmly to the system board.
4. Replace the four M2 x 3-mm screws.
5. Replace the card cage (see Replacing the Card Cage).
6. Replace the palm rest assembly (Replacing the Palm Rest Assembly).
7. Replace the keyboard (see Replacing the Keyboard).
8. Replace the LED cover (see Replacing the LED Cover).
9. Replace the display assembly (see Replacing the Edge-to-Edge Display or Replacing the Display Assembly).
10. Replace the secondary hard drive (see Replacing the Secondary Hard Drive (HDD2)).
11. Replace the base assembly cover (see Replacing the Base Assembly Cover).
12. Follow the procedures in After Working on Your Computer.

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# Right I/O Board

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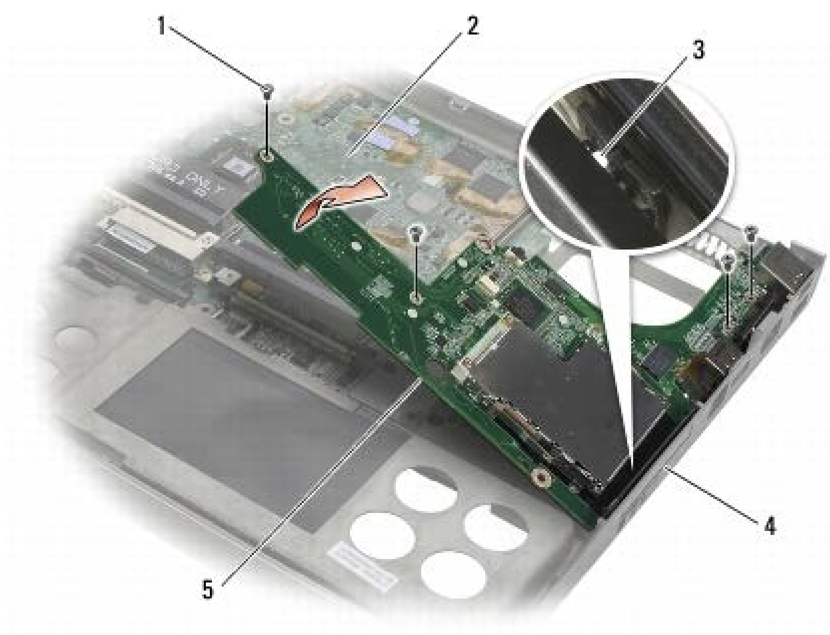


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## Removing the Right I/O Board

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Remove the secondary hard drive (see Removing the Secondary Hard Drive (HDD2)).
4. Remove the display assembly (see Removing the Edge-to-Edge Display or Removing the Display Assembly).
5. Remove the LED cover (see Removing the LED Cover).
6. Remove the keyboard (see Removing the Keyboard).
7. Remove the palm rest (see Removing the Palm Rest Assembly).
8. Remove the four M2 x 3-mm screws on the right I/O board.
9. Lift the right I/O board at an angle to disconnect it from the system board and to ease the connectors out of the base assembly




| | | | |
|---|---|---|---|
| 1 | M2 x 3-mm screws (4) | 2 | system board |
| 3 | wireless switch | 4 | base assembly |
| | | | |

| | | | |
|---|---|---|---|
| 5 | right I/O board | | |

# Replacing the Right I/O Board

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Align the connectors on the right I/O board with the connector slots on the base assembly.
2. Set the right I/O board in at an angle and press down on the board to ensure it connects firmly to the system board.
3. Replace the four M2 x 3-mm screws.
4. Replace the card cage (see Replacing the Card Cage).
5. Replace the palm rest assembly (Replacing the Palm Rest Assembly).
6. Replace the keyboard (see Replacing the Keyboard).
7. Replace the LED cover (see Replacing the LED Cover).
8. Replace the display assembly (see Replacing the Edge-to-Edge Display or Replacing the Display Assembly).
9. Replace the secondary hard drive (see Replacing the Secondary Hard Drive (HDD2)).
10. Replace the base assembly cover (see Replacing the Base Assembly Cover).
11. Follow the procedures in After Working on Your Computer.

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# System Board

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The system board's BIOS chip contains the Service Tag, which is also visible on a barcode label on the bottom of the computer. The replacement kit for the system board includes media that provides a utility for transferring the Service Tag to the replacement system board.

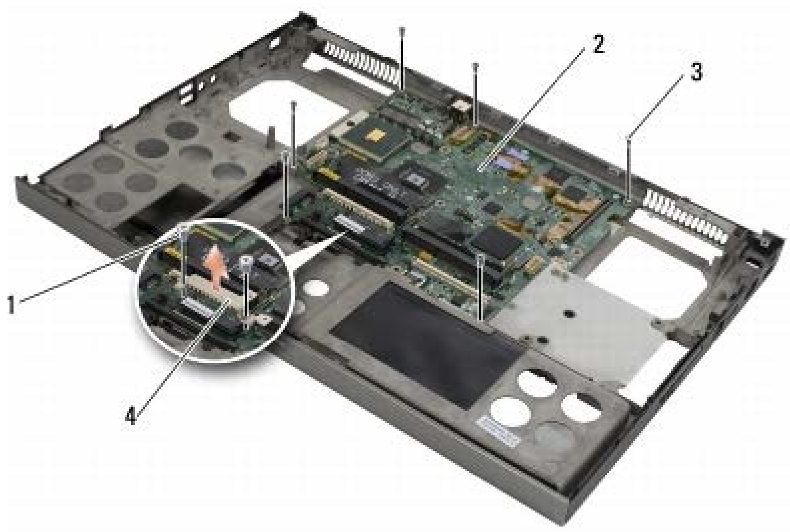
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## Removing the System Board

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.
2. Remove the base assembly cover (see Removing the Base Assembly Cover).
3. Remove the primary hard drive (see Removing the Primary Hard Drive (HDD1)) and the secondary hard drive (see Removing the Secondary Hard Drive (HDD2)).
4. Remove the optical drive (see Removing the Optical Drive).
5. If applicable, remove the WWAN card, (see Removing a WWAN Card).
6. If applicable, remove the card from the WLAN/WiMax card slot (see Removing the WLAN/WiMax Card).
7. If applicable, remove the card from the WPAN/UWB card slot (see Removing a WPAN Card).
8. Remove the DIMM C and DIMM D memory modules (see Removing a Memory Module).
9. Remove the coin-cell battery (see Removing the Coin-Cell Battery).
10. Remove the LED cover (see Removing the LED Cover).
11. Remove the keyboard (see Removing the Keyboard).
12. Remove the display assembly (see Removing the Edge-to-Edge Display or Removing the Display Assembly).
13. Remove the palm rest (see Removing the Palm Rest Assembly).
14. Remove the DIMM A and DIMM B memory modules (see Removing a Memory Module).
15. Remove the fan (see Removing the Fan).
16. Remove the processor heatsink assembly (see Removing the Processor Heatsink Assembly).
17. Remove the video card/heatsink assembly (see Removing the Video Card/Heatsink Assembly).
18. Remove the processor (see Removing the Processor Module).
19. Remove the card cage (see Removing the Card Cage).
20. Remove the left I/O board (see Removing the Left I/O Board).
21. Remove the right I/O board (see Removing the Right I/O Board).
22. Remove the eight M2.5 x 5-mm screws labeled with white arrows from the system board.

23. Remove the two M2.5 x 8-mm screws from the bracket and remove the bracket.




| | | | |
|---|---|---|---|
| 1 | M2.5 x 8-mm screws (2) | 2 | system board |
| 3 | M2.5 x 5-mm screws (8) | 4 | bracket |

24. Lift the system board out of the base assembly.



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# Replacing the System Board

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

**NOTICE: Ensure that any loose cables do not get caught beneath the system board.**

1. Place the system board into the base assembly.
2. Replace the bracket with the two M2.5 x 8-mm screws.
3. Replace the eight M2.5 x 5-mm screws on the system board in the holes labeled with white arrows.

4. Replace the right I/O board (see Replacing the Right I/O Board).
5. Replace the left I/O board (see Replacing the Left I/O Board).
6. Replace the card cage (see Replacing the Card Cage).
7. Replace the processor (see Replacing the Processor Module).
8. Replace the video card/heatsink assembly (see Replacing the Video Card/Heatsink Assembly).
9. Replace the processor heatsink assembly (see Replacing the Processor Heatsink Assembly).
10. Replace the fan (see Replacing the Fan).
11. Replace the DIMM A and DIMM B memory modules (see Replacing a Memory Module).
12. Replace the palm rest (see Replacing the Palm Rest Assembly).
13. Replace the display assembly (see Replacing the Edge-to-Edge Display or Replacing the Display Assembly).
14. Replace the keyboard (see Replacing the Keyboard).
15. Replace the LED cover (see Replacing the LED Cover).
16. Replace the coin-cell battery (see Replacing the Coin-Cell Battery).
17. Replace the DIMM C and DIMM D memory modules (see Replacing a Memory Module).
18. If applicable, replace the WWAN card, (see Replacing a WWAN Card).
19. If applicable, replace the card in the WLAN/WiMax card slot (see Replacing the WLAN/WiMax Card).
20. If applicable, replace the card in the WPAN/UWB card slot (see Replacing a WPAN Card).
21. Replace the optical drive (see Replacing the Optical Drive).
22. Replace the primary hard drive (see Replacing the Primary Hard Drive (HDD1)) and the secondary hard drive (see Replacing the Secondary Hard Drive (HDD2)).
23. Replace the base assembly cover (see Replacing the Base Assembly Cover).
24. Follow the procedures in After Working on Your Computer.

**NOTE:** If you use a BIOS update program disc to flash the BIOS, press <F12> before inserting the disc in order to set the computer to boot from the disc for one time only. Otherwise, you must enter the system setup program to change the default boot order.

25. Flash update the BIOS (see Flashing the BIOS for more information).
26. Enter the system setup program to update the BIOS on the new system board with the computer Service Tag. For information on the system setup program, see the *Dell™ Technology Guide* at **support.dell.com**.

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# Flashing the BIOS

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If a BIOS-update program CD is provided with a new system board, flash the BIOS from the CD. If you do not have a BIOS-update program CD, flash the BIOS from the hard drive.

---

## Flashing the BIOS From a CD

**NOTICE: Plug the AC adapter into a known good power source to prevent a loss of power. Failure to do so may cause system damage.**

1. Ensure that the AC adapter is plugged in and that the main battery is installed properly.
2. Press <F12> before inserting the BIOS-update program CD so that you can set up the computer to boot from a CD for one time only. Otherwise, you must enter the system setup program to change the default boot order.
3. Insert the BIOS-update program CD, and turn on the computer.

**NOTICE: Do not interrupt this process once it begins. Doing so may cause system damage.**

Follow the instructions that appear on the screen. The computer continues to boot and updates the new BIOS. When the flash update is complete, the computer will automatically reboot.

4. Remove the flash BIOS update program CD from the drive.

---

## Flashing the BIOS From the Hard Drive

**NOTICE: Plug the AC adapter into a known good power source to prevent a loss of power. Failure to do so may cause system damage.**

1. Ensure that the AC adapter is plugged in, the main battery is properly installed, and a network cable is attached.
2. Turn on the computer.
3. Locate the latest BIOS update file for your computer at **support.dell.com**.
4. Click **Download Now** to download the file.
5. If the **Export Compliance Disclaimer** window appears, click **Yes, I Accept this Agreement**.

   The **File Download** window appears.

6. Click **Save this program to disk**, and then click **OK**.

   The **Save In** window appears.

7. Click the down arrow to view the **Save In** menu, select **Desktop**, and then click **Save**.

The file downloads to your desktop.

8. Click **Close** if the **Download Complete** window appears.

   The file icon appears on your desktop and is titled the same as the downloaded BIOS update file.

9. Double-click the file icon on the desktop and follow the instructions on the screen.

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# Biometer Cable

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## Removing the Biometer Cable

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Follow the instructions in Before Working on Your Computer.
2. Remove the LED cover (see Removing the LED Cover).
3. Remove the keyboard (see Removing the Keyboard).
4. Disconnect the biometer cable from the system board.

## Replacing the Biometer Cable

**CAUTION: Before working inside your computer, read the safety information that shipped with your computer. For additional safety best practices information, see the Regulatory Compliance Homepage on www.dell.com at: www.dell.com/regulatory_compliance.**

1. Reconnect the biometer cable to the system board.
2. Replace the keyboard (see Replacing the Keyboard).
3. Replace the LED cover (see Replacing the LED Cover).
4. Follow the procedures in After Working on Your Computer.

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